SOCIETY FOR ADVANCEMENT OF MANAGEMENT

Advanced Management

COMBINED WITH MODERN MANAGEMENT

NEW PERSPECTIVES IN MANAGEMENT

IN THIS ISSUE

- Scientific Management
- Engineering Education
- Personnel
- Production
- Management Development

VOL. XVII NO. 12

DECEMBER 1952

Remington Rand Methods News

Let's talk control methods at Cleveland Maintenance Show

Many types of effective records for maintenance control can be studied at Booths 507 and 511, Public Auditorium, Jan. 19-22

For profitable new approaches to the record-keeping problems of a maintenance department, there's nothing like seeing how other firms get results. Also, at the Maintenance Show, we will introduce to you a new idea or two in maintenance control — demonstrated for the first time anywhere.

And, naturally, we will show you many of the production and materials control methods described in our manual X-1268. If you can't visit with us in Cleveland, be sure to send coupon below for helpful literature on subjects of interest to you.

Look to your preventive maintenance record for help in keeping plant output at peak

As production equipment grows more complicated, a breakdown becomes more costly. Preventive maintenance control is more vital than ever for plant efficiency. Your records must help *prevent* the failures — or else!

Maintenance superintendents who have a healthy hatred for paperwork always like our simplified visible methods which give maintenance *control* with minimum clerical work.

These methods visually signal the next inspection date for *every* piece of equipment; tell what inspection is needed; permit scheduling of work ahead. Every man's time can be planned for maximum efficiency. Maintenance work loads can be stabilized.

Also, these methods eliminate the guesswork on proper interval between inspections. Decisions can be made on the basis of actual experience for each type of equipment.

Likewise, the records help fix responsibility for an unnecessary breakdown; revealing whether the failure was due to operator abuse or careless maintenance work.

The plant engineer gets all the facts for determining when it will pay to replace a part or machine. He has a complete and convenient history of servicing and repair costs, as well as depreciation on the equipment.

These methods are flexible; can be adapted to your own special needs. See how they have been tied in with preventive maintenance manuals; adapted to special types of equipment such as electric motors; etc.

Study the procedures and methods, as well as preventive maintenance and property records used successfully in many well-known plants. Ask for folders **KD-656** and **KD-705,** also for methods file **MC-727** which is available on a ten-day loan.

Get better maintenance from smaller inventory

There's a firm of 2,000 employees operating on a total maintenance inventory of only $30,000 *which turns over at the rate of nine times a year.* What's more, they don't have to worry about running short of any part or material needed to keep the machines running.

This achievement was made possible by centralizing the inventory records and the purchasing of maintenance supplies under a control system which Remington Rand designed and installed.

Previously, individual department heads had done much of their own buying. This led to wasteful duplication of stocks. Likewise, they passed up the valuable savings of volume buying because each plant bought from its own sources. Nor could they get the service which comes with planned buying.

Previously, an entire department might be shut down for lack of a single part in the stockroom when it was needed. Now the stocks cannot fall below a safe minimum on any item without management knowing about it.

Let us show you how such a system can work for small plants or large — with minimum paperwork. Ask for our new methods file **MC-802.**

QUICK RELIEF FOR COMMON MAINTENANCE HEADACHES

A small part can give you a big pain — when it's the wrong part. Poor description of parts and materials brings all kinds of trouble: shortages and repair delays, duplications and overstocks. But the cure is simple. Identify and classify each item properly, so it can be referred to by exact number at every step from purchasing to costing. See how our engineers have helped other firms accomplish this at minimum cost. Ask for booklet **BSD-10.**

Remington Rand INC

Management Controls Reference Library
Room 1554, 315 Fourth Avenue, New York 10

Please circle the literature you desire:

X-1268	**KD-656**	**KD-705**
MC-727	**MC-802**	**BSD-10**

Name_____

Title_____

Firm_____

Address_____

City_____

P-8

Volume XVII Number 12

December 1952

Advanced Management

IN THIS ISSUE . . .

ADVANCED MANAGEMENT, published monthly by Society for Advancement of Management, 411 Fifth Avenue, New York 16, N. Y., is merged with MODERN MANAGEMENT, and is successor to The Society for the Advancement of Management Journal, the Bulletin of the Taylor Society and of The Society of Industrial Engineers. Re-entered as second-class matter, December 23, 1949, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Copyright, 1952, Society for Advancement of Management. Subscription rate: $8.00 per year. Single copies: 75 cents (members); $1.00 (non-members). An index to ADVANCED MANAGEMENT is published annually, and the contents are also indexed in *Industrial Arts Index* which is available at Public Libraries. Notification of address changes must be given four weeks in advance.

Edward W. Jochim

A Case Study of the Scientific Method

By EDWARD W. JOCHIM
President, SAM, 1952-1953

THE OPINION Research Corporation recently did an analysis on persuasion that is a fine case study of the scientific method in practical operation. The subject is highly controversial but one of utmost current national importance—the "excess profits tax."

The record showed that before the law was passed, 300 business men presented their views in vigorous opposition, submitting over 1,700 pages of testimony, voluminous exhibits and company hardship cases. It is, therefore, evident that to make it politically possible for congressmen to vote against the excess profits tax, it is necessary to create opposition to the tax in the "grass roots."

Despite these self-evident facts, companies have done virtually nothing to build "grass roots" opposition to the tax through even the obvious channels of employee publications or stockholder reports. In fact, most voters are getting no information on this destructive tax.

A nationwide survey exploring the nature of the problem revealed that here, as in other forms of communications, semantics is important. Uninformed people naturally accepted a tax of the type indicated by the name "excess profits tax" as being desirable. However, when the tax was referred to as the 82% tax, majority opinion was immediately against it.

Four pamphlets were prepared to test different arguments and approaches. These pamphlets were field tested in accordance with accepted procedure. The results:

1. The public is by no means dead set in favor of the tax.
2. Educational efforts can produce results.
3. The manner of handling educational efforts is critical.
4. Information is most effective when focused on the well-being of the average man.
5. Even merely telling about the 82% rate helps.
6. Calm, informational style works better than slam-bang arguments.
7. There is a tremendous informational vacuum.

This exemplifies the essence of the scientific approach — the determination of the problem, analysis of available information, preparation of several possible solutions, and the testing of the possible solutions to determine the optimum solution. All that is needed to make this a perfect case study is the sufficiently wide application of the indicative solution to test the end result.

It is not too difficult to imagine what the results would be, if only a substantial part of the funds and efforts wasted in attempting to correct this tax were funneled into the indicated optimum channels.

The real question is why even some of the most ardent practitioners of scientific management do not apply scientific management to all problems in place of merely to the type of problems referred to as technical? The possible savings in money, time and effort are tremendous. The greatest result would be the attainment of worthwhile objectives in place of futile striving for them. ✪

Management's Debt To Engineers*

By L. URWICK

A masterful analysis of the development of scientific management and the problems that lie ahead.

CALVIN RICE was Secretary of the American Society of Mechanical Engineers from 1906 to 1934. The Management Division of the Society was founded in 1920 or precisely at the midpoint of his stewardship. This development of the Society's activities had his full support and approval. He was largely responsible for the publishers' decision to issue Taylor's "Shop Management" in book form. This is, however, the first occasion on which this memorial lecture founded in his honour, and to further his ideals of increased understanding between engineers of different countries and the stimulation of the programs of meetings outside New York, has been assigned to a visitor from overseas primarily interested in management questions. It seemed to me appropriate, therefore, when you, Mr. President, did me the honour of asking me to select my own subject, that I should devote my talk to trying to survey, however inadequately and superficially, the inescapable debt which students of business management throughout the world owe to the engineering profession in the United States.

There must be those among you who feel with me that in advancing the frontiers of this new body of knowledge which we term "management," in applying the objective spirit of scientific investigation fearlessly to social and human as well as to technical problems, lies our civilization's best hope of an escape from the dilemma which beats upon "our proud and angry dust" in these middle decades of the twentieth century. For that dilemma, however complex its outward manifestations, is in its essence simple.

In little more than 250 years, the

Col. Urwick delivers the Calvin Rice Lecture (this article) at the Western Hemisphere Management Congress.

scientific curiosity released by the Renaissance has resulted in a major cultural revolution. Man has acquired a control over his material environment quite unprecedented in the history of the human race. It is but a century and a half since the wooden three-deckers who broke the line at Trafalgar, the day that Nelson died in the Victory's cockpit, were utterly dependent on the skillful use of wind and tide for propulsion and manoeuvre. Yet, within less than 100 years, a British poet was writing of:

> "The strength of twice three thousand horse that seeks the single goal
> The line that holds the rending course, the hate that swings the whole:
> The stripped hulls, slinking through the gloom, at gaze and gone again—
> The Brides of Death that wait the groom —the Choosers of the Slain."[1]

All that has happened in the half-century since those lines were written is merely an enlargement and a commentary on this tremendous access of power over material things. The Spitfires and the Hurricanes shooting the Luftwaffe to pieces over the smiling shires of Southern England, the American carrier forces that set a new pattern of sea warfare at Midway and the Coral Sea, the

HIGHLIGHTS ON THE AUTHOR

Col. Lyndall Urwick is an international authority on management. He has been a member of SAM for over 30 years and was Secretary General of the International Committee for Scientific Management from 1932-1935. He was awarded the CIOS Gold Medal in 1951 for outstanding achievement in the field of international management. Active as a consultant for many years, he is a charter member of the British Institute of Management and was Vice Chairman of the Council of BIM in 1947. He is an author of many management books and articles and a lecturer on management subjects. Presently he is in this country on an AMA Fellowship, and he is carrying on a study in Management Education. Recently, he was made a Life Member of ASME. Chairman and Managing Director, Urwick Orr & Partners, Ltd., London, England.

*This paper is reproduced through the courtesy of ASME.

sudden blast of a yet more terrible force that reduced Hiroshima to pulverized dust almost in the twinkling of an eye—these things are of one piece.

Nor is the record all a tale of destruction. Even as I speak, there are construction gangs out in the wilderness in British Columbia harnessing water-power to man's service on a scale undreamed of even 25 years ago. Then the job could not have been contemplated. For every man and every ton of supplies has to be flown in. This is only one of the tremendous projects to which engineers and business men in alliance are setting their hands in the land of great opportunity which marches with the Northern frontier of the United States.

PRICE OF POWER

Why then, with this tremendous power in our hands, with so much that is hopeful just over the horizon, should we be rent with faction, afraid, as many are afraid, of the very future of humanity as a species?

For a very simple reason. This newfound power over material things, these gifts which engineering above every other profession has placed within our reach, are not unconditional. The price of power is understanding, the insight to use it a right. As every engineer knows, a culture dependent on power-driven machinery has its own postulates. Above all, the proper, the effective use of modern machinery demands of men an intricacy of cooperation, a refinement of social discipline, such as they have never before contemplated. All around us is the evidence of this truth.

Less than a century ago, the farmer's wife went into town to do her shopping by the local carrier's cart. If she was late, it would wait patiently at the crossroads while she panted up the lane. It could make up the time on the road and, if it didn't, it was unimportant. Today she may use a railway. The social inconvenience of even slight delay with a train carrying 200 or 300 people from A to B cannot be tolerated. She must be at the depot in time to catch her train, or it will go without her. A railway schedule is a set of rules for imposing social discipline, rules supported by immediate sanctions. As the toll of death on the highways bears witness, we have scarcely begun to solve the problems of social discipline set by the automobile.

A factory is still legally a workshop—a shelter to which workers repair to exercise their individual skills. Law always tends to lag somewhat conspicuously behind the facts. As every production engineer knows, a modern factory is nothing of the kind. It is a single integrated machine in which individual effort counts for very little save so far as it is built into the whole. It is a very intricate machine planned in great detail, in which any deviation from plan, however trivial, causes losses and excess costs out of all proportion greater than the incident which gives rise to them. If men are to work successfully with these highly geared machines there must be an intricacy and precision of social discipline which are something quite new in human experience.

NEED FOR SOCIAL SKILLS

Our ability to meet this challenge, to develop the social skills which a mechanised economy so imperatively demands, appears not only to be failing to increase: as far as the evidence goes, it is decreasing. The most objective and fundamental piece of research which has been directed to such problems in the lifetime of anyone present is the series of enquiries known as the Hawthorne experiments. To be sure they have issued in a vast superstructure of statistical analysis and theoretical exposition on an extremely narrow experimental basis. The man who directed the whole enquiry, the late Professor Elton Mayo, was no brash speculator. He had the scepticism of the true scientist to an exceptional degree and stated his generalizations in the most careful phrases.

> "The typical industrial community of today is an adaptive society composed of individuals of varied origins . . . Difficulties of relating themselves to others and consequent solitariness and unhappiness characterize many of these people . . . Groupings frequently form in an attitude of wariness or hostility to other groups . . . If our social skills (that is our ability to secure cooperation between people) had advanced step by step with our technical skills, there would not have been another European war."[2]

To meet this critical, this urgent situation which faces us all—how to organize our societies so that the inescapable demands of power-driven machinery shall not overwhelm us and issue in an orgie of mutual destruction, a Gotterdammerung of our civilization—we have, seemingly, only the political concepts of an outmoded yesterday, ideas of organization which are little more than the obsolescent mental equipment of a handicraft age. Yet, as Herbert Spencer observed over a century ago:

> "Socially as well as individually organization is indispensable to growth; beyond a certain point there cannot be further growth without further organization."

An American economist put the issue quite clearly before the first world war:

> "So far is the machine process from having yet recast the principles of industrial management, as distinct from technological procedure, that the efforts inspired in responsible public officials and public-spirited citizens by this patent discrepancy have hitherto been directed wholly to regulating industry into consonance with the antiquated scheme of business principles, rather than to take thought how best to conduct industrial affairs and the distribution of livelihood in consonance with the technical requirements of the machine industry."[3]

RESEARCH IN SOCIAL SCIENCES

The way of escape from this dilemma is not easy. Research into material things, in the physical sciences, yields immediate and obvious dividends. So that the new wealth which power-driven machinery made possible has been poured back unstintingly into metallurgy, engineering, electricity and so on. The results of discoveries in these fields are applied readily, if not indeed greedily, immediately they are available. By contrast, research in the social sciences is a far more remote and less favourable prospect. We have only to reflect that psychology, the science of human behavior, on which all exact knowledge in this field must ultimately depend, has only begun to emerge from a branch of speculative philosophy into a modern inductive and experimental study within the last three quarters of a century. The problems of social or group behaviour are, of course, far more complex and resistant to measurement, than are those of individual behaviour.

Moreover, the results of developments in the social sciences are only applied slowly and with great difficulty. Custom and tradition determine our expectations of how others will behave and our own norms of conduct. They are not only the cement which holds our societies together, which make human cooperation possible, but the social patterns which derive from them are the basis of that satisfactory social living which is one

of the deepest needs of the human spirit. Man is a gregarious animal. It is not surprising that we regard originality in social thinking with the gravest suspicion, that epithets such as "heterodox" and "radical" are terms of abuse, that social invention only makes any impress on established thinking at the speed of water dropping on a stone.

For these reasons, there is not only a vast and dangerous unbalance in our knowledge about our material and our human problems, there is a great and perilous delay in applying exact knowledge to social organization, even where it is available.

Nor must we overlook the effect of these tendencies on the minds of those best qualified to help us to meet our current difficulties, those in positions of leadership. They face a double temptation. An increasing proportion of the individuals in such positions are scientifically trained. On the one hand this inclines them to push their own particular methodology beyond the point where it has validity. But, on the other, it makes them aware of the rigorous character of scientific criteria, of the limitations of ordinary human judgment, and of how frequently they are compelled to discharge practical responsibilities for which they have little qualification save the valour of ignorance.

Opportunities of evading such responsibilities by laying the burden on the shoulders of some "expert" or other are extremely seductive—the modern equivalent of the sirens against whose charms earlier mariners took such elaborate precautions. And, unlike those ladies (the evidence as to their sex is inconclusive, but I am far too human to say "neuters") the "expert" is not always a passive factor in the situation. He is often too willing, for ordinary human reasons to which he fails to apply his rigorous analysis of the behavior of others, to wear the cloak of a little brief authority: it conceals his nakedness of exact information on the subject in question.

There is no more pathetic spectacle than the specialist turned executive who uses the scepticism, so proper in one of the physical sciences, his awareness of the limitations of exact knowledge, as an excuse for evading the responsibilities which life has laid upon him. The point has been charmingly expressed by the Spanish philosopher—Ortega y Gasset:

> "Life cannot wait until the sciences may have explained the universe scientifically. We cannot put off living until we are ready. The most salient characteristic of life is its coerciveness: it is always urgent 'here and now', without any possible postponement. . . . If the physicist had to live by the ideas of his science, you may rest assured that he would not be so finicky as to wait for some other investigator to complete his research a century or so later. He would renounce the hope of a complete scientific solution, and fill in, with approximate or probable anticipations, what the rigorous corpus of physical doctrine lacks at present, and in part always will lack."[4]

A DUAL PROBLEM

If my analysis is correct, we face a dual problem. We must restore the balance of our knowledge. We must learn to push forward research in the social sciences with the same enthusiasm, the same outpouring of resources, which we have hitherto devoted almost exclusively to the physical sciences. At the same time, we must recognize that exact knowledge is a plant of slow growth. While it is developing we have to preserve social order, both nationally and internationally: we have to devise methods of introducing social change where it is proven desirable, despite custom and tradition, without disturbances which render organized life impossible. That is primarily a question of personal leadership, of discovering and developing individuals with the knowledge, the character, the sense of service to their fellowmen, which will convince those they administer of the wisdom of allowing them to lead. We have to redesign our political and social thinking to accord with the postulates of a culture based on power-driven machinery: at the same time we have to keep the ship of organized society afloat.

To quote Ortega y Gasset once more:

> "Society needs good professional men—judges, doctors, engineers. . . . But Society needs before this, and more than this, to be assured that the capacity is developed for another kind of profession, the profession of governing."

The group of engineers who, with the support of the American Society of Mechanical Engineers, first attempted to apply the intellectual methods of science—the tools of definition, analysis, measurement, experiment, and proof—to questions of business management, were the first men in the world to approach this wider problem which I have outlined. They were in fact attempting to take thought "how best to conduct industrial affairs and the distribution of livelihood in consonance with the technical requirements of the machine industry." And they were facing up to both aspects of the problem. They were carving out of ignorance and uncertainty a new branch of human knowledge: they were equally clear that it was a part of their responsibility to hold at arm's length while they did so the chaos that is apt to follow too sudden change.

COOPERATION

They were aware of the need for dealing with the problem of cooperation. Towards the end of his life, before the Congressional Committee of Enquiry in 1912, Frederick Winslow Taylor laid down two basic conditions "without which scientific management cannot be said to exist in any establishment." As the first of these two conditions he placed the development of a common purpose—"both sides take their eyes off the division of the surplus as the all important matter, and *together* turn their attention towards increasing the size of the surplus."[5] He was equally well aware of the need for more research in the social sciences: "there is another type of investigation," wrote he, "which should receive special attention, namely, the accurate study of the motives which influence men."[6]

If they had not been—and Taylor either failed to encounter, or to recognize the significance of, the early work in industrial psychology contributed by Walter Dill Scott, Hugo Munsterberg and others—there was the amazing fact that one of them, Frank Bunker Gilbreth, happened to fall in love with a girl who was a psychologist by education, a teacher by profession, and a mother by vocation. I know of no occurrence in the whole history of human thought more worthy of the epithet "providential" than that fact. Here were three engineers —Taylor, Gantt and Gilbreth— struggling to realize the wider implications of their technique, in travail with "a mental revolution", their great danger that they might not appreciate the difference between applying scientific thinking to material things and to human beings, and one of them married Lillian Moller, a woman who by training, by instinct, and by experience was deeply aware of human beings, the perfect mental complement in the work to which they had set their hands.

Long since she has taken her place in her own right among the pioneers of management. The American Society of Mechanical Engineers again showed its sympathy with the subject by making her one of its first women members, and, more recently, its first woman Honorary Member. Also recently, two of her children by their wit and their good writing have made her name famous in all quarters of the globe and Mrs. *Myrna Loy* Gilbreth has presented the movie public with a dual personality which taxes its powers of discrimination. But I do not think she will blame me for the suggestion that the greatest thing she has ever done, and she has done many great things, was to marry Frank and through that marriage to contribute the influence of the young science of psychology to the nascent management picture.

LEADERSHIP

This triumvirate, or rather quadrumvirate, were, too, fully alive to the importance of leadership. One of Henry Laurence Gantt's three books carries the title "Industrial Leadership." He chose this phrase as the caption of his first lecture in the Page Lecture Series at Yale, in 1915, because he wished to emphasize leadership "over all other elements that make for industrial progress."[7] Business has taken its time in taking that lesson to heart. It was not 'till approximately 1945—thirty years later—that interest in what is called executive development, treating the supply of future leadership as a problem of major importance and organizing for it deliberately, attracted general attention even among the more progressive corporations.

This would not have surprised Frederick Winslow Taylor. He was also deeply sensitive to the difficulties of introducing changes in social thinking. Time after time in later years, when he had become the first professional management consultant, he returned to the point. For instance, "time, and a great deal of time, is involved in a radical change in management, and . . . in the case of a large works if they (the Directors) are incapable of looking ahead and patiently waiting for from two to four years, they had better leave things just as they are, since a change in system involves a change in the ideas, point of view and habits of many men with strong convictions and prejudices, and . . . this can only be brought about slowly and chiefly through a series of object lessons, each of which takes time."[8] Despite the storm of criticism which his ideas provoked among the leaders of organized labour, it remains a fact of record, which should not be forgotten, that there never was a strike in any plant where he himself was operating.

MANAGEMENT AND GOVERNMENT

It may, and has been urged, however, that to claim that this small group were in fact precipitating a revolution in our ideas about government is going too far. Business management is not government: it moves in a different realm of discourse. It is true, however, that Taylor himself and other distinguished authorities who have followed him, notably Henri Fayol and Mary Parker Follett, have been convinced that if valid principles are established bearing on business organization they must be equally applicable to conducting the affairs of a municipality, a state or an empire. In Great Britain, for instance, business management and public administration are often spoken of as contrasted callings involving different techniques. This may well, however, be an example of what the French call "déformation professionelle"—a phrase which is difficult to translate, but which may be rendered freely as "occupational paralysis of the cerebellum."

In the words of Henry Laurence Gantt "administration means administration of human affairs, and the one common element in all enterprises is the human element."[9] It is possible that the claim by other vocations that management knowledge is not applicable in their special circumstances is only a variant on the old alibi "my business is different" which was so serious an obstacle to the diffusion of an understanding of management in industry in its early stages. If we turn to the only other art with a scientific foundation which, as is management, is primarily concerned with human beings, namely the art of medicine, it is difficult to imagine how it could have made satisfactory progress on a basis of vocational distinctions. To be sure it recognizes certain occupational diseases, but their cure is derived from a general knowledge of medical practice and not from the exclusive study of particular callings. Artists' amnesia, professors' paranoia or the psycho-pathology of politicians do not suggest fruitful lines of enquiry.

Certainly a business enterprise is a form of human cooperation for economic purposes, a society with a special object within the larger society of the nation. To manage it is to govern it just as surely as conducting the business of a municipality or a state or an empire is to govern it. Indeed if, following Mr. Peter Drucker, we agree that the business corporation is *the* typical institution in our modern society, the problem of governing it well may not only be analagous to, but more important to the community than, the problem of governing states or empires. I can see no major distinction, and I have had some experience of both, between the problems arising in the government of business and in the business of government.

A MATTER OF EVOLUTION

During the course of the Congressional Enquiry already mentioned, Taylor was asked "You do not claim a monopoly on scientific management?" His reply should be hung framed in every office where men are concerned with the subject. "I should say not. My gracious, I do not believe there is any man connected with scientific management who has the slightest pride of authorship in connection with it. Every one of us realizes that this has been the work of 100 men or more, and that the work which any one of us may have done is but a small fraction of the whole. This is a movement of large proportions, and no man counts for much of anything in it. It is a matter of evolution, of many men, each doing his proper share in the development, and I think any man would be disgusted to have it said that he had invented scientific management, or that he was even very much of a factor in scientific management. Such a statement would be an insult to the whole movement."[10]

Those words were spoken 40 years ago. Since, many thousands of men and women all over the world have devoted their lives to the subject. There has been an international committee for scientific management since 1925. Its Secretary, my old friend and colleague, Mr. Hugo de Haan, is with us today: he has been giving invaluable service to the management movement for the last quarter of a century.

OUR DEBT TO ASME

I have mentioned so far four people —Taylor, Gantt and the Gilbreths, all members of the American Society of Mechanical Engineers, whose names were conspicuous in the early days of the movement. But, I think it accords with the spirit of Taylor's observation which I have just quoted, and with our general knowledge of the way in which new categories of knowledge develop, to suggest that the contribution of these individuals as inventors and initiators was less important than the fact that they focussed and organized tendencies in human thought which were already in the atmosphere, when they started on the work of their lives. The ASME placed all of us in their debt when they gave them a ready platform for management concepts. F. W. Taylor presented four papers to the Society on such subjects and was its President; H. L. Gantt 11 such papers; F. B. Gilbreth four papers; and Lillian Gilbreth eight papers, up to 1949. But I believe that the American engineering profession rendered the world and its future an even greater service by providing a climate of professional opinion in which what I may perhaps describe as "extracurricular ideas" could take root and germinate. It is this breadth of vision, this determination not to confine their interest within too narrow technical bounds, for which the world owes that profession its undying gratitude.

We are here celebrating the centenary of the American Society of Civil Engineers founded in November, 1852. Its first circular issued at that time reveals this spirit. It welcomes as members not only all categories of engineers, but architects and "other persons who, by profession, are interested in the advancement of science." It expresses the hope that "the bond of union established by membership in the same society, seeking the same end, and by the same means, will do much to quiet the unworthy jealousies which have tended to diminish the usefulness of distinct societies formed heretofore by the different professions for their individual benefit."

After March, 1855 the Society was in abeyance until October, 1867, partly because of the Civil War. But at the first annual convention of the reconstituted society held in 1869, John B. Jervis, an Honorary Member of the Society, struck a similar broad note:

> "No skill," he said, "in forming lines and levels and in devising structures, will complete the education of an engineer without an intelligent capacity for conducting business. This is an important item in his education and indispensable to a successful practice. . . . Some people suppose an engineer, as a matter of course, knows nothing about business management. An absurd mistake. No profession more needs a thorough business qualification. . . . I think I am fully warranted in the opinion, that the training and practice of an engineer should make him peculiarly eminent as a business man, not less than skilled in erecting and designing works in his profession."

Similarly, when The American Society of Mechanical Engineers came to be formed, A. L. Holley, C. E., one of the founders and an Honorary Member in Perpetuity, took the chair at the preliminary meeting held in New York in February, 1880. On this occasion he said:

> "In the American Institute of Mining Engineers and in the Iron and Steel Institute of Great Britain, anyone is qualified who is engaged in mining and metallurgy. The advantages of the association of business men with engineers in these societies are notorious; these advantages are not only large membership, and hence large incomes to devote to publications and illustrations, but they lie chiefly in the direct business results of bringing professional knowledge, capital and business talent together under the most favorable circumstances."

From the very beginning that spirit of accommodation was manifest in the proceedings of the Society. F. W. Taylor's first paper on a management subject, "A Piece-Rate System," was read in 1895. But this was merely regarded as a contribution to the prevailing interest in methods of wage-payment, somewhat to Taylor's disgust. It was only in 1903 with his "Shop Management," which as I have said owed much to the encouragement of Calvin Rice, that he really focussed the attention of his fellow engineers on his management thinking. At the conclusion of that paper he acknowledged the contributions of eight other men "among the many improvements for which the originators will probably never receive the credit which they deserve."

CONTRIBUTIONS OF OTHERS

Among these eight were Oberlin Smith whose "Mnemonic System of Order Numbers" was presented at the Society's third meeting at Altoona, Pa., in 1881. He was one of the original members and a frequent contributor in the eighties. Most of his papers had a management angle, for instance, "Experimental Mechanics," a plea for more research, at the second meeting in 1881; "The Systematic Preservation of Drawings" in 1882; the "Graphical Analysis of Reciprocating Motions" in 1890; "Inventory Valuation of Plant" in 1886; and "Intrinsic Value of Special Tools" in 1887. He was elected the Society's ninth President in 1889. His paper on Order Numbers established one of the earliest international links in management. In 1889, Messrs. Emile Garcke and J. M. Fells published their "Factory Accounts," one of the earliest management books to appear in Great Britain: they reprinted Oberlin Smith's paper in full. It may be noted that the two authors were respectively an engineer and an accountant. In the Britain of that date when the commercial and engineering departments of most factories usually lived on opposite sides of a heavily-defended frontier, for members of these two professions to collaborate in a book was for Montague and Capulet not only to marry but to have a baby.

Contemporary with Oberlin Smith was Henry Robinson Towne who was President of the Yale and Towne Mfg. Co. and preceded Smith by one year as the Society's eighth President in 1889: he was elected an honorary member in 1921. In 1884, he presented a paper on "A Drawing Office System" at the Society's ninth meeting. On this subject, he had been preceded by C. T. Porter who presented "A New Method of Keeping Mechanical Drawings" at the third meeting in 1881. In 1886, Towne followed up with his famous paper on "The Engineer as an Economist." This was a direct challenge to those engineers who felt that the Society should confine itself strictly to technical subjects and that management problems lay outside its proper field of interest. "The true function of the engineer," said Towne, "is, or should be, not only to determine how physical problems may be solved, but also how they may be solved most economically." Between 1887 and 1912, he presented five further papers on management subjects.

Taylor selected one of the eight men mentioned for special recognition. He wrote:

> "The card system of shop returns invented and introduced as a complete system by Captain Henry Metcalfe, U. S. Army, in the government shops of the Frankford Arsenal represents another such

distinct advance in the art of management. The writer appreciates the difficulty of this undertaking as he was at the time engaged in the slow evolution of a similar system in the Midvale Steel Works which, however, was the result of a gradual development instead of a complete, well thought-out invention as was that of Captain Metcalfe."[11]

Captain Henry Metcalfe, an officer in the Ordnance Corps, was the inventor of the magazine system of loading rifles: his clip, being of wood, was rapidly superseded. While in charge of the Frankford Arsenal, he initiated a system of production control which was, as far as the writer is aware, the first example of the thorough application of the unit document or card principle to the paperwork of industry. He presented a paper to the Society in 1886 entitled, "A Shop Order System of Accounts." His book on the subject, "The Cost of Manufactures and the Administration of Workshops, Public and Private" appeared in 1885 and is an early management classic.[12]

I should like to add that when I applied for this book, published 67 years ago, at the New York Public Library, at 5:30 on a recent Sunday afternoon, it was on my reading desk within two minutes. This fact seems to me a remarkable tribute to the efficiency both of the library and of the card system which Metcalfe frankly borrowed from library practice and applied to production control. His paper to the Society was not included in the "complete list of papers in the Transactions . . . dealing with industrial management" issued as Appendix II of the Report on "The Present State of the Art of Industrial Management" presented by the Society's sub-committee on Administration in 1912.

I hope you will regard as proven my conviction that the attitude and outlook of the American engineering profession, when Taylor was still quite a young man, were already concerned with problems of management, had laid the foundations of certain lines of enquiry, and were predisposed to welcome further developments. To say this is not to detract one iota from the genius and the achievement of the four persons whom I have described as the great quadrumvirate. Indeed it seems to me to raise their contribution to a higher power, as expressing and focussing a widely felt, but dimly appreciated, need of their time. What they did was to seize the opportunity thus presented to them. They supplied, in their turn, a whole series of new and stimulating ideas, above all a unifying concept, a philosophy which gave the study of management definition and tremendous impetus. But, if the opportunity had not been there, their ideas might well have been dissipated and frustrated in vain struggles for a hearing of any kind, their energy wasted in clambering onto any sort of platform rather than in taking thought as to what they should say when they got there. That has been, too often, the fate of original minds in a world not markedly sympathetic to originality.

It is indeed difficult to realize in these later days when, in the United States at all events, management is an established subject and all recognize its importance, either the quality of that support or what the sympathy of men like Towne and Oberlin Smith, Horace K. Hathaway and James Mapes Dodge must have meant to the pioneers. Roy Stannard Baker, reporting the hearings in the Eastern Rates case of 1910 wrote:

> "As one sober, hard-headed business man after another testified as to what had been accomplished in his plant, . . . the spirit of incredulity changed to one of deep interest. Another factor in carrying conviction to the hearers was the extraordinary fervor and enthusiasm expressed by every man who testified. Theirs was the firm faith of apostles: it (scientific management) was a philosophy that worked and they had the figures to show it. 'This,' said Mr. Commissioner Lane to one of the witnesses, 'has become a sort of substitute for religion with you'."[13]

SUPPORT FOR THE MOVEMENT

It was the general attitude of the American engineering profession which made possible the generation of that profound interest and confidence in a small but vital group. To those who believe as I do, that in the development of scientific thinking about government lies the only hope of humanity today, the significance of that attitude *at the beginning of a new order of thinking*, was incalculable. In words used in another context, "Some altars are safe; some debts will never be dishonoured. . . . There remains the stark simplicity of Terence — 'In truth they have deserved to be remembered of us'."[14]

Of course there was a reaction. In every profession there are men who believe with all sincerity that the only way to keep the milk of the world pure is to sterilize the cow. The most scientific training is no guarantee against vocational provincialism: there are always would-be martyrs looking for a parish pump to die with their backs to it. Taylor's paper on the "Principles of Scientific Management" was not welcomed, despite the fact that he was a past President of the Society.

This opposition was well handled by a new generation of engineers who appreciated the importance of the management movement. Ever since, the Society's records have been starred with the names of engineers who have also made outstanding contributions to the theory and/or the practice of management. Among its living Honorary Members, in addition to Lillian Gilbreth, are William L. Batt, Harold V. Coes, Ralph E. Flanders, and Dexter S. Kimball, all of whom have held office as President, and Herbert Hoover. Among former officers appear Morris L. Cooke, Horace P. Liversedge and Robert B. Wolf.

Papers on management subjects appear under 18 headings in its most recent index of transactions. In the 1940-1949 period the caption "Management" by itself included 46 papers, an average of just over five a year. The management division attracts the interest of a greater number of members than any other.

LEON PRATT ALFORD

While this happy result is a product of the enthusiasm and interest of the membership as a whole, there is one more name which must be mentioned—the late Leon Pratt Alford. He was Secretary of the Sub-Committee on Administration, which in 1912 prepared the report on "The Present State of the Art of Industrial Management" already mentioned: at that time he was editor of the AMERICAN MACHINIST. On the formation of the Management Division of the Society in 1920, he became its first President. In 1922, he conceived the idea of following up the original report with a second report to the Annual Meeting of the Society on "Ten Years' Progress in Management." He presented a third report in 1932, and he was already well advanced in his preparations for a fourth report in 1942 when he died suddenly in January of that year. The work was picked up immediately by the Executive Committee of the Management Division which nominated a Report Committee under the Chairmanship of Dr.

Lillian Gilbreth. The report was completed along the lines of Mr. Alford's original plan. A fifth report is in preparation for the fall of this year.

These first four reports, covering a period of more than 30 years, and all of them prepared in some degree under the unifying influence of a single mind deeply versed in management literature and practice, form a unique contribution to our knowledge of the subject. Many of us in other countries have viewed with great admiration the tremendous vigour with which the study and practice of management have been developed in the United States over this period. The task of trying to keep ourselves informed has sometimes been intimidating. As the provision of educational facilities in management has expanded, it has sometimes seemed to us that the publication of a comprehensive text-book at fairly frequent intervals has become almost an occupational disease with American professors of business administration. Putting aside the fact that there is as yet little common agreement as to the pattern into which management knowledge should be organized, these text-books often appear to be aiming at the principle of "bigger and better elephants." I know few of them which do not contain a large proportion of redundant matter, redundant because it has already been stated effectively elsewhere. I know none of them light enough to be carried conveniently in an ordinary brief-case.

VALUABLE GUIDES

Amid this welter of ponderous volumes, these decennial reports, brief, authoritative and yet omitting nothing of real importance, have been the most valuable of guides. They are of a piece with what I have always regarded as Alford's other major contribution to management knowledge—the most distinguished series of handbooks, beginning with "Management's Handbook," continuing as "The Cost and Production Handbook" which, in its turn, developed into "The Costing Handbook" and "The Production Handbook," most of which he designed and edited for The Ronald Press. He was made an Honorary Member of the Society in 1941. With Lillian Gilbreth he was a bridge between the early pioneering days and the stupendous development of the subject we see around us today.

Management in the United States has grown up. It has its own organizations—the American Management Association, The Society for the Advancement of Management, and The National Industrial Conference Board, among others. No doubt there are questionings and searchings of heart among some members of the A.S.M.E. as to whether the Society is right in continuing to treat the Management Division as one of its major activities. It is not for me, officially, I believe, an "unregistered alien," to venture an opinion on so delicate, so domestic, a matter. I may, however, remind you that in every kind of group known to us, as young males move out of adolescence they have a tendency for a period to "lock horns" with the old man. That is healthy enough: it's an integral part of the machinery which keeps the race going. It only becomes a tragedy if the old man lacks the courage and the wisdom to avoid a conflict harmful to the group.

CONCLUSION

On behalf of my fellow students of management in other countries I know I can say with absolute truth how deep is their gratitude to the United States for fostering and fathering this great movement in human thought. As I have tried to show, it owed almost everything in the beginning to the support and vision of the American engineering profession. They would view with the deepest regret and dismay any signs that that profession was less interested in the subject or was abating one jot of its enthusiasm and leadership.

They would feel that that was not only a hurt to management all over the world, but a loss to engineering in the United States. The most far-reaching enquiry into engineering education that the world has yet known was staged in this country. The report of that enquiry, usually known as the Wickenden Report, states the following important conclusion: If the engineer is to play his full part as a member of society in the twentieth century he must retain all the special qualities of the engineer but — "add to them a more generous humanism." Management study is the obvious means of introducing that "more generous humanism" into the education of the engineer.

So, to those of you who believe in expanding and strengthening the work of the Management Division, I would say "stick to your guns" — not only for the sake of its splendid past, for which we are all in your debt, but still more for the sake of your own future. For without better management and a wider appreciation of management principles in the Western democracies, the outlook for our civilization is bleak.

To the younger men I would add, be under no illusions. Scientific Management is the hard way, the long haul. The world infinitely prefers its ideologies, the modern alibi for a theory, its superstitions, its petty politics. It has been well said that "the price of freedom is eternal vigilance": the price of social insight which will stand the test of scientific analysis is a continual succession of men and women who are ready to fight for Truth and, if necessary, to die for it.

Management, government, is not a science. It is difficult to contemplate that it will ever become a pure science. It is an art. But it is an art which can be practised in one of two tempers. There is the temper of the old-time craftsman who was merely apprenticed to a master, who learned his craft unsystematically by trial and error and practised it in the half-light of custom and tradition. Or, there is the temper of the modern medical man, who knows that his skill is based on a score of underlying sciences and can only develop by developments in those sciences and their application, who realizes that "clinical experience" does not mean his personal history but scores and hundreds of "cases" which provide an adequate statistical answer to some problem, who recognizes that in the interests of his patients he must often use imperfectly informed judgment, but tries his utmost to ensure that, when he does so, his mind is controlled by the objectivity, the respect for facts and the care in amassing and assessing all available data which are the hallmarks of a true scientific training.

Practical management responsibilities can be met in one of those two tempers. You will find often that it is your duty, your inescapable duty, to make decisions where the facts are obscure and inadequate, the issues confused and the outcome highly speculative. The first syllable of management is man. Man is idiosyncratic, eccentric, often unreliable. In many directions, we, as yet, know very little that is exact about his be-

haviour and its causes. Go ahead we must. We can proceed "by guess or by God." Or, we can make the best use of the organized knowledge about the subject that is available, and, at the point where knowledge fails, fall back on a well-tested intellectual technique to eliminate the biases and the errors to which as human beings we are inevitably prone.

Time after time you will feel that you are blind and groping, that science has failed you. It will not matter, unless your courage also fails you. The valour of ignorance is merely stupid: the courage that makes the best use of available knowledge and then consciously takes a calculated risk is one of the highest qualities of the human spirit.

Draw strength and comfort from the memory of the great men whose task is done but whose story remains with us. Be valiant for Truth in your time, a soldier of Sincerity, and do not worry too much about the consequences. Keep untrammelled the breadth of vision and the generosity of outlook of your great profession, which helped them, and which will help you and your sons and your sons' sons. Stick to the fifth stone of objective truth and you will add a little piece in your turn to the great edifice we are all trying to build.

"Bless your blindness, glory in your groping,
Mock at your betters with an upward chin,
And when the moment has gone by for hoping,
Sling that fifth stone, O son of mine, and win.

Grief do I give you, grief and dreadful laughter,
Sackcloth for banner, ashes in your wine,
Go forth! Go forth! Nor ask me what comes after,
The fifth stone shall not fail you, son of mine.
Go forth! Go forth! And slay the Philistine!"[15]

---

[1]Kipling, Rudyard, "The Destroyers."
[2]Mayo, Elton, "The Social Problems of an Industrial Civilization," Boston, Harvard University Press, 1945, digest and page 33.
[3]Veblen, Tharstein, "The Instinct of Workmanship," New York, The MacMillan Company, 1914, page 342.
[4]"Mission of the University," London, Kegan Paul, 1946, page 146. Op. cit. page 45.
[5]Taylor, Frederick Winslow, "Scientific Management," Harper & Brothers, New York, 1947. "Testimony," pages 29, 30.
[6]Ibid, "The Principles of Scientific Management," page 119.
[7]Gantt, Henry Lawrence, "Industrial Leadership," Yale University Press, 1916, page 1.
[8]Taylor, F. W.—op. cit. "Shop Management," page 130.
[9]Op. cit. page 9.
[10]Op. cit. "Testimony," page 282.
[11]Op. cit. "Shop Management," page 202.
[12]New York, John Wiley and Sons, 1885.
[13]The American Magazine, March 1911, quoted F. B. Copley, "Frederick Winslow Taylor—Father of Scientific Management," Harper & Bros., New York, 1923, v.i. page 8.
[14]Waddell, Helen, "The Wandering Scholars," Constable & Co., London, 7th Edn. 1934, pages 220, 221.
[15]Benson, Stella, "The Young David" from "Twenty."

Developing Industrial Engineering Curricula

By M. E. MUNDEL

The need for more adequate university training of industrial engineers is emphasized and recommendations presented for sounder curricula.

AT THE PRESENT TIME, the engineering educational system finds itself in the rather unique position of producing a great many less graduates than are required to even begin to meet industrial demands. The possible stultifying effects of such an insatiable market are numerous. Athough this discussion is concerned with only a few of these effects, it is not meant to suggest that the others are necessarily less important. Of particular interest, however, is the possible effect upon curricula in industrial engineering and upon the contribution that such curricula can make to our national welfare.

Industrial engineering has had a rather sporadic growth, although, at the present time, there are 27 accredited curricula in Industrial Engineering (or synonymous titles) and 14 options in Industrial Engineering in existence, as well as a potent demand for the graduates of such programs. However, the question still frequently arises as to whether there is such a field as "Industrial Engineering." The re-emergence of this question in many quarters is one effect of the present huge demand for engineers which has tended to reduce, to some extent, the feasibility of, or any pressing need for, an appraisal of any specificity of demand or need.

INDUSTRIAL ENGINEERING FIELD

This basic question seems to have been answered completely by Dean Hollister who stated:

"An engineer is characterized by his ability to apply creatively scientific principles to design or develop structures, machines, apparatus or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design, and of the limitations of behavior imposed by such design; or to forecast their behavior under specific operating conditions; all as respects an intended function, economics of operation and safety to life and property."[1]

The difference between industrial engineers and other firmly recognized academic groups is a matter of area of activity rather than one of any basic nature. The industrial engineer's problems usually concern the design, prediction of performance, and the control of an integrated human group activity, and the related physical facilities, as well as the pattern of inter-relationships. Because of the nature of the problem, psychology, or the science of human behavior, becomes one of his fundamental sciences rather than an ancillary one, although this is in addition to the usual engineering complement of basic sciences. Further, this requires a greater dependence upon the mathematics of probability, statistics, rather than a major dependence on pure calculus or differential equations as a quantifying tool, although a reasonable amount of calculus is still a necessity as a basis for a realistic approach to statistics as well as for its own sake.

The design problems of an industrial engineer range from the design of a hand motion pattern required for a simple manual task to the design of organizational or coordinational facilities for the activities of large groups of people and equipment. Physical and psychological properties of people, properties of equipment, processes, products, markets and sociological factors must all be taken into consideration. Surely such problems are as much engineering as any other recognized subdivisions of engineering. Surely this should answer the question, "Is There Such a Field as Industrial Engineering?"

One may well ask, why is this question of any real importance? Since the turn of the century, our manufacturing establishments have increased in size and number until they are a prime component of our national economy. Indeed, our production techniques are one of the major factors that so greatly differentiates us from Europe, and enables us to maintain ourselves free in a distressed world as well as buy on the world market as required to maintain our standard of living. It is not that Europe does not know how to design superlative goods; they cannot produce them in a comparatively economic fashion; they cannot similarly count on science being applied to their production facilities. Also, they can hardly, in some cases, count on designing an acceptable industrial milieu and instead turn to political action. No claim is made that industrial engineering is the sole factor creating this difference, but

HIGHLIGHTS ON THE AUTHOR

Dr. Marvin E. Mundel is an educator and consultant in the field of industrial engineering. He is presently Director, Ordinance Corps Management Engineering Training Program at the Rock Island Arsenal, Department of the Army. He taught for a number of years at Purdue University. Active in SAM for many years, most recently he served as a Panel Chairman at the Chicago Chapter Annual Time Study Conference. He is a member of ASME, SEE, and is a registered Professional Engineer.

it does not seem unreasonable to assume that it has played an important role inasmuch as we have a group who perform this function to a much greater extent than most other countries. Also, the export of this approach was an important function of the Economic Cooperation Administration and is an important part of its successor, the Mutual Security Agency. In addition, it seems as gratuitous to deprecate industrial engineering because its functions, which are so vital to American industry, are often attempted by sub-professional level technicians, as it would be to deprecate civil engineering because aborigines design and build bridges. When a need exists, a group will attempt to meet it, their real success being a measure of their trained competence. It seems only fair to suggest that the present national concentration on production as well as the continued need for production, if we as a people are to progress, points to a need for more adequate training in industrial engineering than is presently available. Indeed, a considerable amount of the science needs to be developed, but of what other branch of engineering is this not also true?

CURRICULUM DESIGN

How may a curriculum to fulfill this need be designed? One might also ask, will such a curriculum be designed when the first impression of the demand today is that it is for engineers as they exist? This would appear to be one of the dangerous ways in which our present monstrous demand may stultify our development.

For further justification of the real need, one has only to look at the General Electric Manufacturing Training Program in which a period of 36 months is planned for development of a group to implement the application of a production science. It is stated, ". . . (the need rests on) . . . the fact that many previously routine jobs have become so complex as to require full-time attention of professionally trained specialists."[2] However, General Electric, an industrial colossus, can train for its own needs. What can smaller firms do but look to the schools? Do not the universities have a definite responsibility to industry, as a whole, to meet their long-range needs?

In the design of an adequate curriculum in Industrial Engineering, the following might serve as a starting point:

"It certainly appears desirable that a major stress be placed upon those elements of a curriculum that will give most continuous and lasting support to a graduate's professional life.

"Building into the program in this (mathematics) and other means for further technical self-development of the individual after graduation is the second most important feature of a well designed curriculum." (As) "the third feature . . . the program should aim at the development and expansion of the imaginative process of creative thought.

"The content in each of the five categories (see below) must be determined in terms of the need of the graduate two or three decades ahead . . . with most of the details to be filled in through further study and acquisition of experience in the field.

"1. Basic sciences
2. Applied science
3. Applied engineering
4. Administrative and managerial
5. General."[3]

It might be well before suggesting any specificity for the curriculum, to examine the probable career of an industrial engineer. It would appear that it has a general pattern of five steps, as follows, which is probably typical, in a greatly abbreviated sense, of any other engineer:

1. Works at analyzing and obtaining data or measurements for use in a design.
2. Works at preparing part of a design.
3. Works with some responsibility for part of a design.
4. Works with responsibility for a complete design.
5. Decides on whether a design shall be attempted or how it shall be attempted or makes decisions for which only scant data exists.

With all of the preceding material in mind, and in reference to the previously described task of an industrial engineer, and with the realization that it may take some time to adequately realize the educational goal, the following is suggested as the general content of an adequate curriculum:

1. *Basic sciences*
   Mathematics, physics, chemistry, psychology, sociology, physiology.
2. *Applied science*
   Mechanics, thermodynamics, fluid mechanics, human organization, properties of materials, electrical circuit theory, human work methods and work measurement, production processes.
3. *Applied engineering*
   Machine design, tool design, process design, workplace design, production control design, plant design, organizational design, quality control.
4. *Administrative*
   Cost control, labor relations, human relations.
5. *General*
   Reading, writing, drawing, speaking, economics, history, law.

While the placing of some of the course areas may be unusual, it is intended that they be taught so as to fall into the category indicated. Also, laboratory, study and discussion are not considered separately, and, hence, are not listed separately, although full use should be made of suitable educational approaches as befits each area.

SUMMARY

It is not believed that any curriculum extant fulfills these general specifications. Also, the various pressures on present industrial engineering groups tend to prevent adequate development.

Further, the field is still greatly handicapped by the general ignorance of its very existence among entering students. Because of this situation, industrial engineering receives many of its students from several odd sources. One source may consist of competent students, dissatisfied with their present curricula, frequently for valid reasons of interest, and searching for their true field, who change to industrial engineering. Another group may consist of students on whom other faculty groups are putting pressure to change their course of study, because of their relatively poor performance, due either to lack of interest or ability. This latter has many undesirable consequences such as may be anticipated when any one group has the problem of separating poor performance due to lack of interest from poor performance due to lack of ability and still assuming the usual manifold responsibilities of educators.

Industrial engineering may also be brought to the student's attention by a vigorous staff who actively seek students

who may be interested. This last procedure, also, often has undesirable consequences in respect to intra-faculty relations unless the upper levels of the university inculcate a broad understanding of the total picture of educational objectives.

In short, it seems today, with the additional stresses of demand, it will certainly take careful administration and encouragement to assist industrial engineering education into achieving the growth that our national economy demands. ✪

[1] Hollister, S. C., "Differentiating Characteristics of an Engineering Curriculum," Journal of Engr. Educ., Jan., 1950.

[2] *G. E. Educational Service News*, Jan., 1952.

[3] Hollister, S. C., Crouse, C. S., Grant, L. F. and Hooven, M. D., "Report of Committee on Adequacy and Standards of Engineering Education," *Journal of Engr. Educ.*, Jan., 1952.

PERSONNEL

W. E. Park

Master Mechanics In Human Maintenance*

By W. E. PARK

A deserved recognition of the functions and contributions of the industrial nurse.

NO DOUBT most of you are aware that analysis of accident causes has shown that 2% of accidents are due to vagaries of nature, such as wind or lightning over which no one has any control; 13% are due to mechanical failure of machines or supports under stress; and 85% are due to human failure. So you see, *human failure* is the biggest single factor in the cause of accidents.

Breakdown in human beings causes many expensive problems for industry. Accidents are just one of the expenses. Many other expensive disturbances occur in industry such as slowing of production, increase in spoiled or imperfect products, breakages in handling, sabotage, etc. In many cases, the cause is traceable to human carelessness, human weaknesses or even illness.

Henry Ford II recognized the importance of the human factor in 1946 when he said, "We have not yet solved the problems of mass production, for our failure in human engineering is creating waste and inefficiency which handicap the very purpose of mass production—lower costs."[1] Henry Ford called it human engineering; I am calling it human maintenance. We think of one who services a machine and keeps it in repair as being engaged in machine maintenance. Why not think of one who ministers to the needs of men's broken bodies and minds as engaged in human maintenance?

THE INDUSTRIAL NURSE

You industrial nurses, along with your medical associates in other branches of the healing art, constitute the team of expert workmen trained and skilled in human maintenance. If you can visualize yourselves in the role of Master Mechanics of human maintenance, you can perhaps comprehend the significance of the subject chosen for this talk.

You, as industrial nurses, are the mechanics who stand closest to the machine you service in industry — the human beings who control the mighty power of industry. Men and women are the most important factors in industry. They are more valuable than machines. They are more complicated and more unpredictable than machines. They are more wonderful and elastic than machines because they possess the power of reasoning and the faculty of healing, or natural recovery when broken.

As Master Mechanics of human maintenance, you occupy a most important position in the economics of production and a most honored position in the realm of personal relations. To you and your

*This paper was delivered by Dr. Park before the Industrial Nurses Section of the Greater Minneapolis Safety Council.

HIGHLIGHTS ON THE AUTHOR

Dr. W. E. Park was graduated in Medicine from the University of Toronto in 1927 with honors. He conducted a general practice in rural Ontario until 1942, when he began a career in Industrial Medicine. He distinguished himself during the war years through his clinical research on T.N.T. poisoning. In 1945, he was chosen to develop and head the health Services and Industrial Hygiene Program of Canada's Atomic Energy Project at Chalk River, Ontario. After four and one half years in that position, he moved to Minneapolis, Minn., to become Director of the Division of Industrial Health in the Minnesota Department of Health. Since May 1, 1952, Dr. Park has been assigned the job of developing an Industrial Health Program in the Minneapolis Health Department.

medical associates is entrusted the maintenance of the most valuable unit in the whole process of production.

When a plant manager wants a machine for a certain job, he studies the machines made by many companies. He inquires into their structural materials, their strength and ability to stand stress and strain. He studies the specifications of the machine. He sizes up its ability to do the job he wants done. He learns what adjustments are possible. He is interested in its adaptability and its normal life span of usefulness.

Selecting an employee is just as important as choosing a machine. You, as industrial nurses, do not have the responsibility of selecting employees. That is the responsibility of the personnel department, and they rely heavily on the doctor for a physical examination.

Sometimes a nurse assists the doctor in some phases of the physical examination. No matter who makes the examination, it is important that every part of it is done well. It is important for industry to know, as far as possible, what kind of a man is being hired. Will he stand up under the strain placed upon him? Is he capable of assuming greater responsibility? Many of these questions cannot be answered at the time a man is hired, at least not with as much certainty as when a machine is bought.

Just as a machine is subject to the supervision of the maintenance crew, after it is put in operation, just so an employee, once he has started to work, comes under your supervision for health maintenance.

It is taken for granted that a man whose duty it is to maintain or repair a machine knows what he is doing. In other words, he must have adequate training. The more training and experience he has the better job he can do. In the same way, an industrial nurse must have adequate training. Of course, the basic training which all should have is a full nursing course with R. N. standing. Additional training in some public health subjects and a thorough grounding in industrial health will greatly improve a nurse's chances of success in industry.

VARIETY OF TOOLS

Have you ever observed what a variety of tools are required, and used, by mechanics and maintenance men? The time is past when they can fix everything with a monkey wrench and a screwdriver. The time, too, is past when industry can be satisfied with a nurse who can do nothing but first aid. The ability to tie up wounds is important, but it is just one tool in the hands of a modern Master Mechanic of human maintenance.

What are some of the tools a successful industrial nurse must have? Two of the most important are sympathy and kindness. These are natural personality traits. You are born with them. They are not taught at nursing school, but many nurses have them because such personality traits as these often lead girls to enter the nursing profession.

Other natural tools are curiosity, interest and desire to help. These tools require constant care and sharpening. They require purposeful direction. When properly developed, these tools enable you to listen attentively and purposefully. Curiosity can be developed into a probing tool which will enable you to look for and discover the cause behind the immediate action, the present complaint or the latest accident.

The tools or traits which I have so far mentioned are largely of value in discovering the trouble, and I want to add to them the value of a smile. I don't mean a forced smile, but one which bubbles over with good will and reassurance. It goes a long way to win the worker's confidence.

Now, what are the positive tools, the ones which repair the broken machine? They are many. Such things as a well organized and attractive first aid station, properly sterilized instruments, good technics, good instruments and medicines, good and confidential records, and, in general, the know-how of a skilled industrial nurse.

Then, too, there are the resources outside your immediate environment — the doctors you rely upon or refer patients to, the public health, welfare and rehabilitation agencies of your local community, the library and consultative services which are available to you, the open channel of contact you have with top management, the good will and cooperation of the personnel and safety departments in your plant, and the records of achievement and integrity of the nursing profession.

You also have within yourselves personality traits, which can be developed into effective tools. Your own confidence in yourself and what you are doing can reassure and inspire your patient. Clear thinking and constructive suggestion and persuasion can often be translated into effective action by the patient. The good industrial nurse who knows how to do health counseling is a Master Mechanic in human maintenance.

Now, what are some of the wrong tools which a nurse may use? A mechanic who tries to repair a machine with the wrong tools will not only fail to repair it, but may break it further. A nurse using wrong tools may also fail miserably in health counseling. Wrong tools are: indifference, disgust, impatience, annoyance, anger, criticism, betraying confidences, misuse of force and so on.

TREATING HUMAN BREAKDOWNS

No one expects anything from a machine which is not in keeping with its specifications. If we operate or make demands on a machine, which are not in keeping with its specifications, something is sure to go wrong. An industrialist sometimes makes demands on his employees which are beyond their capacity, usually because he has not taken the pains to find out an employee's capacity, or limitations.

When a machine fails to meet the demands made upon it, the foreman does not say the machine is vicious or insubordinate or lazy or disloyal. He does not fire the machine nor discipline it. He orders it taken apart to see why it doesn't work properly. The machine is repaired by the maintenance crew and put back into working order as soon as possible.

Why don't we treat men who break down in much the same way? Why shouldn't a man who is failing or slowing up in his work be sent to the industrial nurse or the plant doctor or psychiatrist, where he can be taken apart, so to speak, to find out what is wrong and correct it as quickly as possible?

I am indebted to Dr. J. L. Rosenstein of Loyola University, Chicago, for much of what I am going to say about human nature.[2]

We know, but we forget, that men, just like machines, often have no control over the things that happen to them, which prevent them from being as good men on the job as we would like them to be, and as good men on the job as they themselves would like to be and could be.

No, our human nature is peculiar in that we reason fairly reasonably about things—tools, equipment and materials—but do not reason so reasonably about people. It means that where people are concerned we must not only be on guard against our own peculiarities, but must remember that the other fellow's human nature is involved in the way he looks at, reacts to, and deals with us, our plans, and any program we want to put over.

ASPECTS OF HUMAN NATURE

What are some of the more exasperating peculiarities found among the specifications of human nature? What are some of the disturbing aspects of human nature which cannot be changed, but of which we should be aware, understand, expect, and allow for in health counseling?

1. *No one is perfect.* Some people are dangerous and accident prone in jobs requiring rhythmic coordination like that needed on a job printing press. Some are handicapped emotionally and have no control over flare-ups. Others are handicapped mentally. These handicaps make men more liable to accidents unless the handicaps are allowed for when job assignments are made.

No amount of discipline, warning, or instruction can change the handicaps. They must be ferreted out and job assignments made with them in mind. People who cannot grasp or apply safety principles are unsafe workers. People who are emotionally distracted are unsafe workers. People who are physically incapable of keeping up with job demands are unsafe workers. Mr. C. J. Velz, of the University of Michigan School of Public Health, said: "It is a well-recognized principle in tooling of industry that it does not pay to use a chisel as a screwdriver. Yet, it is expected that any human can do any job as efficiently as any other. There are too many 'human chisels' being employed as screwdrivers. When industry puts the right man or woman on the right job, a tremendous improvement in efficiency will result . . . industry has been brilliant in mechanical tooling. The challenge is to apply the same brains to 'human tooling'."[3]

In addition, employees cannot always understand or perform at the level expected for continued quality and quantity production. None of your employees is perfect. None of them can be expected to perform adequately at all times, on all jobs, under all conditions.

2. *People do not look ahead.* Because they are not gifted with foresight, people will disregard safety rules which interfere with what they want to do at the moment. They will adjust machinery while it is in motion, remove guards which are not welded on, and "forget" to lock out a switch.

In accident investigations, employees have answered the question of "why" in this fashion: "I didn't put on my gloves because it would have taken too long to go back for them." "I didn't shut off the power because—well, I didn't think."

Hurry and not thinking must be expected. If foresight were a common attribute, if it were normal for people to always act sensibly, if it were normal for them not to do things which are potentially harmful, drunkenness would disappear, gambling joints would be out of business, and men would not get hurt.

3. *People are afraid of what's new.* People do not like new ways because new ways always demand learning new ways of doing. Most people do not want to learn new ways when they are getting along comfortably in the old ways.

Old ways, repeated, become habits. Habits are described by psychologists as "perfect performances." They require no thinking and little effort. They are the most efficient form of mental, physical, and emotional performance.

New ways mean breaking-up habits. They mean non-efficient performance at first. They mean extra exertion. So you may expect opposition to change, unless the worker is first made to feel that the change is something he must have.

In addition to breaking-up accustomed, easy, and comfortable ways of doing, new ways bring the possibility of doing things wrong. Doing things wrong and making mistakes means being subject to criticism, and people avoid such situations if they can. They would rather stay with the old, which they can handle with assurance.

4. *People are led by faith.* Most of us are not brilliant. We do not know how, nor do we have the ability, to analyze and examine all aspects of a situation. That is why we human beings are hungry for leadership. We need assurance that we are doing the right thing and are going in the right direction. We have a great need to have someone we trust to tell us what is right, what to do, what to think, and how to deal with those things which are on our minds.

Once people have faith in a man they will follow him, often to their own harm. That is why it is so important for doctors and nurses to be worthy of the confidence placed in them.

5. *Human nature is nearsighted.* People have no particular goals in life that can be expressed dramatically. They want security, leisure, and a chance to make a living, but they do not have any plans. Few of them have initiative or are self-starters of change even though they may be dissatisfied with their lives. That is why people daydream.

In daydreams people make up for what their lives lack—they attain goals and achieve things with little effort. Their dreams represent what they would like to be like.

6. *People "want in."* People want to know what's going on. They are suspicious and apprehensive about things, people, and ideas they do not understand. That's why they want to feel as though they are participating in the making of plans which will affect them.

Somehow people are not afraid of anything so much as not knowing what will happen. That is often the reason for their reluctance to cooperate in accepting changes.

Most men do not want to be leaders or to run the show or to take responsibility; they do want to know the reasons for changes that affect them, and they do want a chance to be heard when they disagree. In letting a new idea become old by talking about it, they will lose their suspicion or fear.

7. *People want to belong.* People are hungry to be attached to something, to belong to something. That's why they join clubs, lodges, and unions. They want and need something to be part of and to brag about. They need the opportunity to talk about my club, my home, my lodge, my team. They could just as readily brag about our safety record and our production as about our bowling team or our softball team.

They want to be identified with things through which their own self-esteem

will be enhanced even if they have no active part in the development of the worth of these things.

8. *People want something to live up to.* If being the top producer could be made a virtue, if being safe were considered a mark of honor, if being cooperative were made a sign of the good man among employees and increased the importance of the man in the eyes of others, men would be better producers, safer and more cooperative.

9. *People are defensive.* All people do things of which they are not proud. Because of the many imperfections of men and because they do not want their inadequacies to become known, they always have mental fists up to protect their pride, or to save face. They want to uphold their dignity. Sometimes that's all they have, and they will lie, fight, and quarrel to protect it. Usually they will try to cover up their inadequacies by what are called defense or compensatory behaviors.

Defensive behaviors indicate that people are hungry for praise, flattery, a kind word. They all want affection and attention. They need to know that they are not merely employees but are people in the eyes of management.

MANAGEMENT REPRESENTATIVES

Industrial nurses are the representatives of management who stand in a position to recognize the need for understanding and appreciation, and they can honestly assure an employee of his importance. If management did not think every employee important, the company would not have a nurse at all.

You, industrial nurses, are Master Mechanics entrusted with the maintenance of health in your plants. You are the scouts who anticipate human breakdowns. Yours is both a preventive and a salvaging program, and your field of maintenance is your company's most important asset, the flesh, blood, and brains of industry.

Yours is a job which calls for every faculty you possess. In doing it, you are both watch dog and mother confessor. You must be impelled by a keen desire to serve, coupled with sound training, a sympathetic understanding of human nature, and an appreciation of why men behave as they do.

Yours is the privilege of bringing healing to both body and mind, and in doing so you must lose yourself in devotion to your work. In this connection, the words of the Great Physician are particularly applicable: "Whosoever will be great among you, let him be your minister." Matt. 20:26. ✪

---

[1] Ford, Henry II, "The Challenge of Human Engineering," *Advanced Management*, June 1946.

---

[2] Rosenstein, J. L., Ph.D., "You Can't Change Human Nature," *Industrial Nursing*, State of Illinois, Department of Public Health, December 1951.

---

[3] Velz, C. J., "Manpower Prospects Within the Population Structure," *J.A.M.A.*, 147:14, 1319; December 1, 1951.

Wallace Clark International Management Center

By DR. LILLIAN M. GILBRETH

EVER SINCE Pearl Franklin Clark wrote the "Challenge of American Know-How" we have realized how much her husband, Wallace Clark, and she have done to apply the principles of scientific management throughout the world. Now she has made a further contribution to the field of international management.

On December 4, 1952, the Wallace Clark International Management Center located in the School of Commerce, Accounts and Finance of New York University, Washington Square, New York City was dedicated by Chancellor Henry T. Heald. The Center has as its nucleus the management library, foreign reports, other records, papers, pictures and the desk of Wallace Clark.

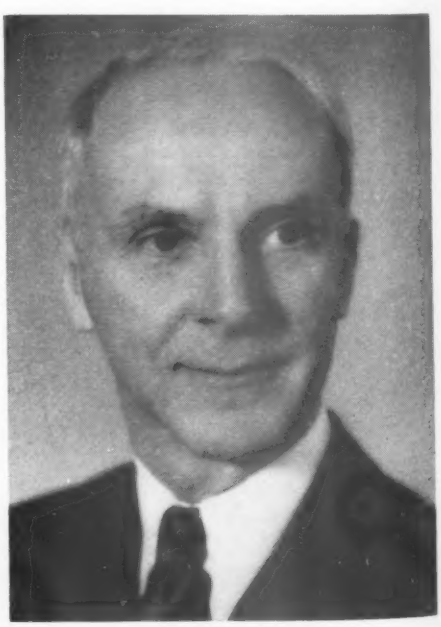
A Committee of outstanding faculty and administrative people of New York University has been appointed to direct the activities of the Wallace Clark International Management Center. This Committee will be assisted by an Advisory Committee of executives working directly in the field of scientific management or closely associated with it. The Center will be available to all the colleges and divisions of the University.

WALLACE CLARK

Wallace Clark always felt that New York University gave him his real start in the field of scientific management. While he was working for the Remington Typewriter Company, he attended the University during the evening and took courses in industrial management. This led ultimately to his joining the staff of Henry L. Gantt. Following his experience with Gantt, Wallace Clark established his own consulting firm, which has achieved national and international recognition.

In 1926, he went to Poland on the Kemmerer Mission. Beginning in 1927, he became a consultant to the Polish government in the management of state industries. His success in this work led to private companies in Poland retaining him. Eventually his clients ranged over 12 European countries and he maintained offices in Paris and London.

Wallace Clark played a major part in the introduction of American "know-how" to Europe. His book, "The Gantt Chart" achieved international recognition and acceptance. The concept of



Wallace Clark

The Wallace Clark International Management Center

planning, which it has been said, characterized the scientific management movement in Europe between the first and second World Wars, was to a considerable extent due to his writing, lecturing and consulting activities during this period.

Knowing that high ideals and happy human relations must accompany technical adequacy, Wallace and Pearl Franklin Clark made their home in the many countries where they worked and came to know the people and their problems as well as the industrial problems of their clients. Underlying Wallace Clark's application of the principles of scientific management was a deep consideration for the people involved.

With the outbreak of war in 1939, Wallace returned to the United States to work with the French Purchasing Mission. During the 1941-5 period, he worked with various government agencies and the armed services. After the end of the war, he reestablished his New York Office and served as a consultant to various corporations. He died in 1948.

ACTIVE IN SOCIETIES

Wallace Clark was a charter member of the Society for the Advancement of Management. He was active in the development of the International Committee of Scientific Management known as CIOS. Throughout his life he played a major part in the American Society of Mechanical Engineers and the Association of Consulting Management Engineers as well as the other management societies. He shared his knowledge and trained many practitioners of scientific management in this country and Europe. Following his death, the management societies established the Wallace Clark Award and a recipient is selected each year by the National Management Council.

THE CENTER

The Wallace Clark Center of International Management will serve as a focal point for research and teaching necessary to meet the changing world conditions and demands. The Mutual Security Administration, UNESCO and CIOS as well as other groups interested in the international management movement are expected to use the Center extensively. The room, seating approximately 30 people, is already serving as a conference room for meetings with management people coming from abroad to visit this country and as a center to train seminar teams being sent by the United States to carry scientific management to other free countries. Many of Wallace Clark's friends from abroad and in the United States have already visited the Center. Mrs. Clark extends an especial invitation to SAM members, when they are in New York City, to visit the Center.

EDITOR'S NOTE: *It is particularly appropriate that Dr. Lillian M. Gilbreth should write this article on the Wallace Clark International Management Center. She has been especially close to the Clarks during their long career in the Scientific Management movement. Colonel Urwick (see article in this issue) notes the great debt that the Scientific Management movement owes to her.* ✪

Small Manufacturers' and Defense Business

By MILLARD H. PRYOR

MANY PEOPLE THINK that only larger companies are able to cope successfully with the problems and difficulties that invariably accompany the fulfilling of a defense contract. There is no question that the big companies do have advantages in capital, prestige, and sometimes entrée. However, in relation to handling defense contracts, we maintain that the speed and flexibility of a small organization offsets the advantage of big companies. The problem, we believe, is not one of size but that of separating the capable and those not so capable. One of the biggest problems is to convince contracting officers of this fact.

ONE COMPANY'S EXPERIENCE

Our experience can be succinctly summarized as follows:

From scratch, with nothing but allotted buildings, and with machines and machine tools yet to be secured, with skilled labor, power, lighting, steam for processing, and office facilities lacking—the nucleus of engineering, production and administrative personnel of the Pryor Manufacturing Co., Mansfield, Ohio, rolled up their sleeves and literally dove into the void—to come up with a production miracle—their finished, inspected and accepted wheel and brake for the Air Force's new B-47 Jet Bomber —all in the incredibly short time of six months and seven days.

It is our position that the Pryor Manufacturing "miracle" is but an example of the way small business can meet the challenge of defense work. Months ago the U. S. Air Force recommended to each of the prime contractors in the wheel and brake industry that it subcontract a percentage of its military production to other manufacturers. After a survey of several interested firms, B. F. Goodrich Co. first gave consideration to the Barnes Manufacturing Co., Mansfield, Ohio, as its secondary source of manufacture. However, since 35% of Barnes' capacity was tied up in production for the Navy, the Corps of Engineers, and the Quartermaster Corps, the Air Force felt that facilities which could be utilized exclusively for Air Force production would prove more desirable.

We then suggested revitalizing Pryor Manufacturing Co. Pryor is an independent company formed in 1942 by the present officials of Barnes. While then operating at a low rate of production, Pryor Manufacturing Co. did have available buildings with 30,000 square feet of floor space and a background of processing magnesium. Because of this, many organizational and operating problems would be simplified; and furthermore, it was readily agreed that Pryor Manufacturing Co. could draw upon Barnes for experienced personnel and technical knowledge. This suggestion proved acceptable to both B. F. Goodrich and the Air Force.

STAFFING

Operating under a tentative contract, we took the initiative by drawing immediately upon the experience of Barnes. Two Barnes executives, the Chief Engineer and a Production Manager and Tool Designer, were transferred to Pryor Manufacturing Co. From a nearby city, we secured an experienced executive with a background in procurement and production during World War II to serve as Administrative Vice President.

The question of personnel is, as always, a difficult one. A few people were transferred over from Barnes, but they had to be trained for the new operations as did practically all of the new people hired. As usual, an attempt was made to get men with backgrounds that indicated training to be worthwhile. In this, we were quite successful. Under the leadership of the new Administrative Vice President and the two former Barnes executives, a good group of employees was developed and a fine state of morale established.

The matter of procuring machines and machine tools became the paramount problem. With these almost impossible to secure, even on long delivery dates, the Air-Materiel Command opened its inventory of tools held in its industrial pool of machines. Not holding out for perfect workable equipment, we agreed to accept any equipment, if it was believed it could be converted to the purpose at hand, or, if it could be made operational for the purpose through work and effort. Single purpose machines, for instance, were converted to general purpose tools.

Given approval by the Government to disperse funds on July 31, 1951, Pryor Manufacturing Co. came through with its first wheel and brake on January 10, 1952. On hand to receive the first finished product were high-ranking officers and civilians from the Air-Materiel Command together with officials of the B. F. Goodrich Company.

DECIDING FACTORS

The above sounds fine, but how much

HIGHLIGHTS ON THE AUTHOR

Millard H. Pryor was graduated from the University of Michigan in 1925 and received an A.M. degree in 1927. Experience includes: vice-president, Keane, Higbie & Co., Detroit, 1925-30; partner, Pryor Co., Detroit, 1931; vice-president and general manager, Renown Stove Co., Owosso, Mich., 1932-36; vice-president, Am. Midland Co., Detroit, 1936-38; president, Hoyt Machine Co., Indianapolis, Ind., 1937-41; president, Barnes Mfg. Co., Mansfield, Ohio, since 1939; Commander, U.S.N.R., 1943-46; president, Pryor Mfg. Co., since 1945; he also served as a member of the contractors' pump industry advisory com., the War Production Board, and he is a trustee of Albion College.

A small manufacturer tells how sound management practices enable him to secure government contracts and contribute to the military effort.

was due to good management and how much to good luck? Probably no one can tell. In looking backward, several things stand out as deciding factors.

One basic decision was to put this contract in a separate corporation. It solved a question of possible inter-service conflict and it saved time at the start. Placing the contract in Pryor made the matter of a V-Loan easier to handle and simplified cost accounting. Very few, if any, costs have been duplicated. Some negatives have developed due to the division of responsibilities within the Air-Materiel Command, but, in review, this looks like a fortunate decision.

The matter of new management personnel is always something of a gamble. In transferring the two executives from Barnes to Pryor we were dealing with proven qualities. The problem there was to find adequate replacements. In finding our Administrative Vice President outside we were most fortunate. The technique of dealing with a multitude of different government offices has become a specialty. We didn't realize this until we watched this executive rounding up machine tools from all the various services and getting action in spite of almost daily changes in rules. Natural ability plus a great amount of experience in World War II made this possible. Without tools, of course, no production would have been possible. In this instance, I claim that we were just plain lucky. An equally capable man without the background would have taken much longer to get results.

Another factor that was more a matter of good fortune than good judgment concerned the space required. At the time this contract was first discussed, the 30,000 square feet building owned by Barnes was occupied as a warehouse by the Mansfield Tire and Rubber Co. who held a five-year lease with over three years to run. Their willingness to move out and make the space available was an expression of their basic spirit of cooperativeness and community interest. One does not always have such cooperative tenants.

I do not want to imply that the results obtained in this particular operation were all the result of happenstance. Much careful planning and a great amount of work by everyone involved was necessary. Production results seldom just happen. The key to our planning has been fluidity.

CONCLUSION

Our experience in dealing in a small way with as complex and vast an undertaking as the national aircraft program is that it is absolutely necessary to shift and modify all plans upon extremely short notice. Our formula is: (1) an organization be developed; (2) responsibilities be determined; (3) the objective be clearly understood; and (4) the men involved be placed on their own. Too many restrictions and authorizations do not make for fluidity. No one can "roll with the punches" if he has to get an O.K. for every move he makes.

There is certainly no "miracle" about the achievement of Pryor Manufacturing Co. The real "miracle" is that we were allowed this opportunity to prove our ability. Our hope is that this one experience will encourage other contracting officers to look into the background of the men involved rather than the size of their company. ✪

The Great America

THE PROBLEM of choosing and training personnel so as to insure effective and orderly succession to the top levels of management is the most engrossing problem that faces corporation management. It concerns all of you, whether you work for someone else or are self-employed, whether you belong to management or aspire to, whether you are a business man, a professional man, or both, or neither.

In approaching this topic, I am reminded of a conversation I had a few weeks ago with the president of a firm that, for obvious reasons, must remain unnamed. Running into him one evening at a business function, I said, "Henry" that's not his name, either—"Henry, I hear you're going to retire."

"Yes," he replied, "that's right, I'm retiring. It's time to turn over the business to younger hands."

Now this man spent his whole life building up his company; so I said I found that hard to believe.

"No," he insisted, "it's true. I've already turned over the management to a new head man. You know I've been preparing him for this for years. Now he will have to learn by trial and error, and make his own mistakes, just as I did."

"Well, Henry," I told him, "that's fine. But I just can't believe you've really stepped down."

"I have, I have," he said. "It's all somebody else's worry from now on. I only do two things around the office these days. I make the decisions and I sign the checks."

Now the new head man is still "running the business" and Henry is making the decisions and signing the checks. The inescapable fact is that Henry, some day, really will have to step down and entrust the decisions and check book to other hands.

What is true of Henry, of course, is true of every other present corporation executive. Within the next 15 or 20 years, just about every board chairman, president and senior vice president in the country, including this one, will have turned over his work to the succeeding generation. As soon as that, you younger men and your brothers will be in charge of the greatest production and distribution machine in history.

No one knows yet, of course, who those new business executives will be. We take that fact for granted, like the air we breathe and the trees that shade us; but it is actually a remarkable tribute to the way American business operates. It demonstrates that the officers of our corporations are chosen as they should be chosen, democratically, by reason of their talents and abilities, their qualities of leadership. That has not always been true in the past. It is not true today in all other countries. That it is true here certainly is one of the chief reasons why we have had more business progress here than in any other country in the world.

DEFINITION

Let's pause for just a moment to define what we mean when we use the phrase "business executive." According to one definition, an executive is a man who presses a buzzer and someone comes. According to another, the top executive is the man who decides what and why a thing shall be done, while a mid-zone executive is the man who decides where and when to do it. I like the definition of an executive as any man who would be expected to object officially to a policy decision he disapproved.

However we define him, whatever his traits, I think none will question the importance of the manager to his enterprise. The critical element in economic performance is management, and any business owes its corporate unity to the

personality of the first line of management men. Where there are two businesses operating in the same general field, the chief advantage the one has over the other is almost certain to lie in the abilities of the leader and his deputies.

This is true for all businesses, small as well as large. According to one theory of biology, the bigger the animal is, the longer it takes for the brain to realize that the feet are being stepped on. That law would certainly apply to corporations. The effects of good or bad leadership may not be felt by so many people in a small company, but they are certainly felt more quickly and more acutely.

Many of you will agree that the work of the business manager is more exacting now than it has ever been. I ask those of you who are not now in management positions to assume for a moment that you are responsible for the operations of a Pittsburgh company. You have the same basic problems of capital investment, manpower, product development and marketing that your grandfather had. You still have to run a profitable enterprise. Only, now you have problems that your grandfather would have had in much smaller degree, or perhaps not at all.

lan Hunt*

WILYM A. PRICE

Top management makes plans for meeting its basic responsibility to provide adequate management succession.

HIGHLIGHTS ON THE AUTHOR

Gwilym (Welsh for William) Alexander Price joined Westinghouse Electric Corporation as a vice-president in September, 1943, and served as executive vice-president from May, 1945, until his election as president of the company in January, 1946. Prior to his election as an officer of Westinghouse, he had been president of the Peoples-Pittsburgh Trust Company of Pittsburgh (now Peoples First National Bank and Trust Company), since January, 1940. He had served as a trust officer of that company since 1923, as a vice-president since 1930, and as vice-president in charge of trusts since 1937.

After graduation from the University of Pittsburgh Law School in 1917, he enlisted as a private in the army. He rose to a captaincy, commanding the 302nd Heavy Tank Battalion, which served overseas. After World War I, he returned to law practice with the firm which he had served as a clerk while attending law school. In 1920, he became an assistant trust officer of the Pittsburgh Trust Company. In 1923, and 1924, he was a member of the Pennsylvania State Legislature.

THE LARGE CORPORATION

Today's corporation is larger. Its operations are more widespread, its products more diversified, its distribution more complicated, its competition more varied. As a corporation officer, you are responsible not only for more dollars, but handling dollars that belong to other people. Your overhead is greater, your profit margin narrower, your break-even point higher and higher. Your firm pays higher taxes, and you pay a so-called excess profits tax that strikes at the very roots of the enterprise system. You work within the frame-work of government restraint that an earlier generation would have called tyranny. A management job in American industry can still be one of the most enjoyable, most exciting, most creative occupations, but you have to work harder nowadays to make it so.

As the manager's job has grown more demanding, it has also become more important to more people. Far more depends on his decisions today than the success or failure of his particular enterprise. The security of communities and even of the nation may be affected. All business, in Justice Brandeis' words, "now operates in the public interest." Every corporation must carry in ever-increasing amounts what economists call "the social burden of non-economic enterprises."

Although the problems have deepened and the responsibilities have widened, some other factors have stayed constant. The number of hours in a day remain unchanged. The executive, unfortunately, has not developed into a superman. He is pretty much the same sort of person as his predecessor, with the standard number of hands and eyes and, probably, the same brain capacity. We might start training him in his cradle—perhaps we might begin by choosing and training his parents—but that isn't practical yet.

SPECIALISTS DEVELOP

Obviously, no one manager can know all he needs to know today. He may be highly qualified in sales or production, in finance or office procedures, in research or product design, in management engineering or economic forecasts, in taxation or personnel problems. It is doubtful, however, whether he can at first-hand know nearly enough about all of these or even most of them. So the same thing has happened in industrial management as in medicine, law and the other professions. The modern corporation is managed by a staff of specialists. In this staff work, we are seeing a spreading of authority, more people taking part in corporate planning, and a delegation of authority and responsibility downward to those trained to assume them. That adds up to more key jobs for more men.

In this new situation, one thing is clear. The choice of management men, and of the qualified reserves who will eventually take over, cannot be left to chance. Every business today is engaged in The Great American Man Hunt for managerial talent. Every company is constantly seeking ways to assess human abilities, and so to eliminate the risks of accident and haphazard choice in the selection of its leaders. All are striving to find future managers earlier, to keep track of them once they have been found, to challenge them to realize their full capacities, to train them more thoroughly and prepare them better for promotion.

ROLE OF EDUCATION

In this management talent search, the nation's universities and colleges have played an increasingly important role. They, of course, supply the technically trained young men and women who are absorbed each year into our industrial

*This paper was delivered at the Alumni Dinner Meeting, Carnegie Institute of Technology, Pittsburgh, Pa., on October 9, 1952.

economy. It is hard to realize that such technical training was once considered outside the scope of our institutions of higher learning, and that the technical schools and the land-grant colleges had to be created to give what the universities would not give. It is even harder to realize that within the memory of many, the United States contained fewer than 40,000 professional engineers—less than one-tenth the number we now have; and the present number is not nearly large enough.

Since the war, industry has stepped forward into a promising new relationship with the colleges. Industry now realizes that education must not end with graduation. It has called on the engineering colleges to provide more than technically educated graduates. More than ever, we in business are asking for educational aid in advanced training for management.

The Harvard Graduate School's 13-week course for executives and the Leland Stanford summer program for managers are typical examples of the new cooperation between education and industry. The University of Pittsburgh has eight-week courses in Management Problems for Executives. The Alfred Sloan Foundation has given MIT more than $6,000,000 for its new management school. The W. L. and May T. Mellon Foundation has made it possible for you to establish your Graduate School of Industrial Administration and to erect a fine new building recently. One could cite other examples.

The work we are doing at Westinghouse is representative of the total industrial effort in locating, training and promoting men of potential executive talent. We believe that the proper quantity and quality of management personnel cannot be left to chance. Our plans in this regard must be just as careful, just as systematic, as those for the design of our new products, the schedule of our production, the extent of the facilities we will need.

For 25 years, our company's University Relations Department, working with 11 major universities, has directed an educational program for Westinghouse employees. Approximately 2,700 of our people have enrolled, and about 250 have received master's and doctor's degrees.

Our Educational Department each year gives advanced instruction to college graduates who have joined the company for the graduate student course. This year their number exceeds 800. In the first nine months of 1952, more than 1,500 of our supervisors in 24 plants spent nearly 27,000 man hours in our training program. Part of this program, incidentally, is directed at training the non-college man in our plants, for we are very conscious both of our obligation to give him opportunity and of the value he may have for us.

We have installed a new Management Development Program which is providing us with an inventory of our management needs and management manpower. It is giving us working information from which we can better fill vacancies and identify hidden human reserves. It has established means for increasing every manager's effectiveness and ability. About 4,500 of our supervisory people—foremen, section heads, superintendents, division managers, and on up to the senior executive officers—are included in this program of organized opportunity. We are not quite in the class of the great corporation whose vice presidents are so numerous that they must wear name tags at company meetings; but you can see how easily a good man can become lost among 4,500 people unless methodical steps are taken to see that that does not happen. You can see how easy it is for the first line of management to find itself farther and farther away from the men it must depend upon.

FOUR STEPS

Our Management Development Program has four steps. First, we analyze the organization itself. We determine the responsibilities for each management position, and we decide the qualifications of the man who is to fill that position.

In the second step, we appraise the holder of each management position, both as to how well he is doing his job and as to his potentiality for a greater responsibility. This appraisal is conducted by his immediate superior and two others who know his work. It is followed by an interview between the individual and his superior constructively revising his over-all performance.

In the third step, we make an inventory of our management personnel. Each company unit balances its requirements against its resources and assembles information on recommended replacements so that planned and orderly changes can be made as needs arise.

In step four, we try to guide the development of the individual. Such development includes rotation assignments within the company, on-the-job training and off-the-job work, including special courses in colleges, universities and technical schools.

In our program so far, we have not come up with the answers to all our management personnel problems, but we have learned at least what the questions are. Perhaps your graduate school will address itself to those questions and help us search out the ways and means of best developing people for general management positions. That, it seems to me, is a major piece of research in industrial management that American business needs, wants, and would pay for.

Imagine for a moment that you are one of a number of young and promising management candidates coming under the scope of the Westinghouse Management Development Program. You are as eager to make full use of the opportunities offered by that program as we are to have you use them. What are some of the questions to which we need answers in order to make the program work?

LEADING QUESTIONS

First, we want to know how to determine how many of you should receive special training. The number would be figured in relationship to the number of positions to be filled, and to the rate of attrition in a program of this kind. Mortality figures, incidentally, show that in the age group 45 to 49, one-third of the men drop out before they reach 65.

We want to know more about how to choose you for such training. What individual qualities should you have? To what degree should you have them? How can we decide the proper point in your career at which to look for you and select you? We have to observe your performance long enough to judge your abilities. We have to consider the amount of experience you need before you are ready for advanced training.

We want to know when and how we should make periodic appraisals of you and your work, in order to make sure

that we have made a good selection. We want to have other people's thinking on the content of the program to which you are subjected. How much training should you have? How much of it on the job and how much of it outside your job? How much of it should be in organized educational programs? How can we be sure that your abilities are being fully utilized and that you are being advanced as quickly as your growth justifies? Finally, what standards should we use to measure and control the costs of your training? How can we tell when we have spent enough on you, or too much?

Now that we are nearing the end of the first year of operation of our Management Development Program, we do have something more than questions. We have learned that the people in the program want it as much as top management does. We have found—not at all suprisingly—that the earlier you recognize a capable and ambitious man who can effectively manage other people's work, the better it is both for the man and the company. We have re-learned what all the surveys say and our own earlier experience had already taught us—the high importance the American employee places on recognition and on understanding of his function in the total job.

Finally, we have been fortified in our belief that the human individual is the basic asset, the most exceptional, the most precious capital resource of any company.

In the years that lie immediately ahead of us, American industry will need the best management men it can possibly get, for the demands that will be made on them probably will exceed anything in previous experience. These will be the crucial years of our time. Business executives will face graver problems and greater decisions than they have ever met in the past.

They will have to meet unceasing challenges and tests of strength from a powerful and pitiless enemy. At home, they will face the problem of maintaining the efficiency of America's industrial plant, which is the nation's best defense against that enemy. They will have to be prepared against any number of economic dangers that lie ahead of us.

We Americans have expanded our productive facilities at a fantastic rate in the past decade, and we will be faced with the problem of absorbing the products of those extended facilities. We have mistakenly compromised the profit motive which is the wellspring of our capitalist economy. Under confiscatory taxation, every business executive struggles to keep his company from losing its vitally important sense of cost consciousness. A new element, the national union, has infinitely complicated our labor-management relationships.

The business executives, whoever they may be, who will be called upon to meet and solve problems like these will have to be men of stature. We cannot choose them by chance or by prayer only. The most important job that American industry and the American universities have is to work together to educate these men, select them scientifically, train and test them fully, and then give them every possible advantage in the work they will do for human society ✪

New Training Film Catalogue Issued

Encyclopedia Britannica Films, Inc., has released a general catalogue of motion pictures and related materials that should prove valuable to SAM members.

This organization, with over 20 years experience in the education film production field, lists 122 new and authentic sound motion pictures and other related audio-visual materials in the new catalogue.

Executives will find uses for these films in supervisory and executive development programs. Many films have specific application to meeting employee relations problems. Certain ones could prove useful in Chapter programs.

A number of the films are in the field of Business Education. Films concerned with Industrial Purchasing, Office Courtesy and Office Teamwork are noteworthy in this area.

Productivity is one of the most important problems facing management today. SAM members face this problem in their daily operations and discuss it at their meetings. EBF films do not present any simple answers in this management area. They have developed films, however, which tell the *why* of productivity. Without an understanding of the *why* underlying productivity, training and educational efforts with employees and supervisors fail.

Such films as *Industrial Revolution and Productivity, The Atom and Industry, Inflation, and Competition and Big Business* examine the problem of productivity against sound backgrounds of history and knowledge.

These films can be used in a variety of ways. Some companies have organized regular film viewing sessions for their employees. Such sessions can be held at the noon hour as these films run 25 minutes or less.

Showings can be arranged for wives of employees who are increasingly recognized as potent factors in employee morale. As companies get deeper into community relations programs, these and other films can be made available to community groups for use by schools and churches.

Increasingly, management is directing attention to developing and maintaining effective channels of communications with employees. Films, independently produced and educationally unbiassed, offer an effective means of communication between management and employees. Using this catalogue, a company can build a film program or integrate specific films into an overall program to meet its specific needs.

One of the frequent blocks in communications is management-labor conflict. *Working Together*, an EBF film, is the case history of a strike, before and after. Such a film will stimulate management, supervisory and employee thinking. The catalogue lists other useful films as one method of attacking this problem.

SAM program chairmen should find some of these films useful. Films are available for purchase, rental or preview. The catalogue and films are available from Encyclopedia Britannica Films, 1150 Wilmette Ave., Wilmette, Ill., or representatives in large cities. ✪

Student Chapter Activities

On October 30, 1952, the opening day of the Annual Fall SAM Conference, Faculty Advisors and Student Chapter Coordinators met at a breakfast round-table under the leadership of Dr. Ralph L. Jacobs, National SAM Vice President of Student Chapter Operations and Development. Professor George E. Bardon of Manhattan College served as Chairman. The discussion covered such mutual problems as cooperation between local sponsoring SAM chapters and the respective student chapter; fund raising activities; and relationships with the National Office.

Student chapters from various parts of the U. S. and Puerto Rico were represented at the Conference. Under the leadership of Dr. Ralph L. Jacobs, the Presidents of Student chapters met on the evening of the 31st to discuss common problems.

Students from the New York University chapter, under the direction of Prof. Harry Cozzens, served as ushers at the Conference.

STUDENT CHAPTER NEWS

American University. A plant visit to the Bethlehem Steel Co. plant at Sparrows Point, Md. proved very informative for chapter members. At the first business meeting of the school year, Mr. Harry Guinivan, Jr., Executive Vice-President, Industrial Research Consultants, Inc., Washington, D. C., discussed "How Business is Represented in Washington by Consultants."

University of Baltimore. In a meeting with Mr. John Meehan, Student Chapter Coordinator and an executive at Armco Steel Co. and Dean Clifford James, Faculty Advisor, the Program Committee outlined an active year with plant visits and speakers.

Boston University. The chapter has scheduled an active season, including films and outstanding speakers.

Butler University. The chapter heard Mr. Louis Lukenhill, Assistant Vice-President, Link Belt Co. discuss "SAM—What It Means To the Prospective Business Man."

University of California at Los Angeles. The chapter heard Messrs. J. Corey and W. Miller at a recent meeting. Weekly activities have been scheduled, including faculty-member meetings, plant tours, speakers, and films.

Carnegie Institute of Technology. The chapter heard Mr. Earl Cohler, of the Economic Staff of the United Nations, at their last meeting.

City College of New York. The chapter heard a talk by Mr. Donald Rutledge, Employee Relations Manager of the National Broadcasting Company.

University of Connecticut. At recent meetings, the chapter has heard Prof. Lawrence Parrish, Head of the Industry Department; Prof. Harold Smalley, Head of the Time and Motion Study Department and President of the Hartford SAM chapter; and Mr. George Corbett, Traffic Manager, Whitney Chain Co.

De Paul University. Mr. Ray Cross, Faculty Advisor, met with the members to discuss "SAM—What It Is—What It Does." The members have, also, seen several films.

Emory University. The chapter heard Mr. George Torrence, Chairman of the Board, Link Belt Co., talk on the subject, "What Management Wants From Business School Graduates." Mr. Edward W. Jochim, National President of SAM, addressed the entire body of the Business School. He was introduced by the chapter President, A. D. Weitmauer. The chapter has also recently toured the local Sears Roebuck office.

Geneva College. Mr. F. R. Fox, Cost Reduction Supervisor, Westinghouse Electric Co., talked to the chapter on "Methods of Cost Reduction."

University of Georgia. Professor M. E. Kelley spoke to the chapter on "Organization and Business of a Student Chapter."

Hofstra College. As the first part of a well-rounded program, the chapter visited the Renewal Mfg. Co., Mineola, N. Y.

University of Illinois. Mr. Bernard Oswald, Plant Engineer, Glidden Paint Co., talked to the chapter on the topic, "How To Get Along In Business."

Indiana University. Ralph L. Jacobs, National Vice-President in charge of Student Chapter Operations and Development, met with the members. This is the largest of our student chapters.

Lawrence Institute of Technology. Mr. L. G. Spicer, Assistant Director of Personnel, Nash-Kelvinator and President of the Detroit SAM Chapter, spoke before the Lawrence Chapter.

Loyola University at Chicago. Thomas L. Borrelli, Chapter President, presided at the Freshman Orientation Program to acquaint incoming students with the advantages of SAM membership.

University of Maryland. "The Problems of Organization and Management of a Small Factory" were discussed with the chapter by Mr. William Ahrendt, President, Ahrendt Instrument Company, at a recent meeting.

University of Minnesota. Mr. Elmer R. John, Student Chapter Coordinator from the Twin City SAM Chapter, talked to the group on the "Purpose of SAM."

Newark College of Engineering. At the last business meeting, trips to the Linden Plant of General Motors, the Bristol-Meyers Company, and the Budweiser Plant were announced for the near future.

Northeastern University. The last two meetings have been devoted to seeing industrial films and a talk by Mr. Robert

Chadbourne, Vice-President, Associated Industries of Mass.

North Texas State College. The members heard Mr. Josh Fields, Personnel Manager, Magnolia Oil Co., talk on "The Role of the Personnel Department."

Ohio University. The chapter heard Mr. William Shesky, Chief Economist, National Shoe Company, speak on the subject, "Management Problems in the Shoe Industry." Six chapter members attended the Annual SAM Human Relations Conference. A Committee on Research has been established.

Ohio State University. Three members attended the Annual SAM Conference and reported on it to the chapter. The chapter recently heard Mr. Stanley Hellman, North American Aviation, discuss "How To Do Business With the Government."

University of Oklahoma. The chapter recently visited the Goodrich Rubber Co. plant at Miami, Okla.

Oregon State College. Professor G. W. Gleeson talked to the chapter on "What Engineering Societies Can Do For You."

University of Pennsylvania. A rushing smoker was held and 70 members and guests saw a film on process charts and had refreshments.

University of Puerto Rico. Dr. Julio B. Ortiz, Director of the Chamber of Commerce of Puerto Rico, spoke to the chapter. One of the members attended the SAM Annual Fall Conference.

Purdue University. Mr. Warner, Testing Director, Radio Corporation of America, spoke before a recent chapter meeting.

Rensselaer Polytechnic Institute. A joint meeting was held with the Faculty on developing the chapter program for the school year.

University of Rhode Island. The chapter had as its guests Prof. Harrison D. Myrick of Bryant College and President of the Providence SAM Chapter, and Mr. Charles Tingley, Student Chapter Coordinator.

Seton Hall University. Dr. Ralph L. Jacobs addressed the group on the purposes, organization and benefits of SAM.

St. Joseph's College. Chapter activities this Fall have included trips to the Ford Motor Co. plant at Chester, Pa., and to the Radio Corporation of America Plant at Camden, N. J., as well as a talk by Mr. W. Cole Cooling, International Resistor Co. The Regional Conference to be held at St. Joseph's College has been scheduled for March 6, 1953.

St. Louis University. The chapter elected officers at their first meeting of the year.

Syracuse University. The chapter met with ten members of a French Productivity Team touring the United States and discussed industrial management with them.

Temple University. President D. R. Waleski attended the SAM Annual Fall Conference. Twenty-eight members of the chapter attended the 43rd Annual Metal Congress and Exposition in Phila. Also, a tour of the Standard Pressed Steel plant at Jenkintown, Pa. was made.

University of Toledo. The chapter elected officers at its first meeting.

Tulane University. The chapter heard Mr. S. B. Dunbar, Executive Secretary, Louisiana Manufacturers Association, speak on "What an Executive Does in a Day's Work."

College of William and Mary. Messrs. George Murphy and E. Starke Farley addressed the chapter on "Reduction of Production Costs."

University of Wisconsin. The chapter is working closely with the local Madison, Wis. SAM chapter. New officers have been elected.

Woodbury College. At a recent meeting, the chapter heard Mr. E. S. Hochuli, Director of Industrial Relations, General Petroleum Corp., and Mr. Floyd Wohlwend, Merchant's and Manufacturers Association.

Yale University. The chapter heard Professor Holme on the subject, "Waste in Our National Armament Program." A tour was made of the Hull Brewing Co., of New Haven, Conn. ✪

NMC INTERNATIONAL NEWS

EDITOR'S NOTE: NMC International News, written by the staff of the National Management Council, is a regular feature of ADVANCED MANAGEMENT.

The Society for the Advancement of Management is a charter member of NMC, a non-profit, non-political organization founded in 1933 by the leading societies and associations interested in the promotion of the science and art of management. NMC represents the United States in the International Committee for Scientific Management (CIOS), a coordinating, cooperative society, composed of like associations in 20 other countries.

MANAGEMENT SCHOOL

IMPETUS TO HAVE a school of management, which is now being founded in Turin, Italy, was given by the National Management Council's "Conference on Education for Management in Europe," held in New York City, on June 7th and 8th. This conference was attended by 26 educators for the leading schools of advanced management in the United States and 12 European industrialists. The purpose of the conference was to ascertain how American educators could assist European management in establishing management schools in Europe.

Among those from Europe who attended the NMC conference were Professor Vittorio Valletta, President of Fiat, and Dr. Adriano Olivetti, President of the Olivetti Company. Upon their return home, the idea for a school gained momentum. Now, under their auspices, the Industrial Association of Turin has organized an institute of higher learning in the field of business management and industrial organization, open to senior and graduate students as well as people already engaged in industry and business.

The school will be staffed by American educators, each one assisted by two Italian scholars with American degrees. American text books will be translated into Italian and used in teaching the courses. The first term will begin in January, 1953, and the courses will include industrial organization, top management, layout, time and motion study, marketing, business administration, and labor and industrial relations. The student body will be limited to 100 in the beginning.

JANUARY ANNUAL MEETING

The annual meeting and dinner of the National Management Council has been set for January 14, 1953, at the Plaza Hotel, New York City. The business meeting will be held in the White and Gold Room during the day, and, in the evening, dinner will be served in the Terrace Room.

The principal guest of the evening will be newspaperman, author, lecturer, radio and television commentator, Mr. Erwin D. Canham, Editor, of THE CHRISTIAN SCIENCE MONITOR.

In daily contact with the news centers of the world through his staff of foreign correspondents, he also travels widely in search of the facts behind the news.

CONFERENCE PROCEEDINGS

The proceedings of the second Western Hemisphere Conference, held in Chicago on September 8th, under the auspices of the International Committee for Scientific Management with the Brazilian Institute of Management, the Canadian Management Council and the National Management Council participating under the administration of the Management Division of the Society of Mechanical Engineers, are now available.

These papers are available in bound form for 50 cents to ADVANCED MANAGEMENT readers. Address your requests for these proceedings to the National Management Council, 501 Fifth Avenue, New York 17, N. Y.

NEXT MANAGEMENT CONGRESS

The International Committee for Scientific Management will hold its Xth International Management Congress from February 19th - 25th, 1954, in Sao Paulo, Brazil. The host organization for this Congress is the Instituto de Organizacao Racional do Trabalho of Sao Paulo.

Dr. Moacyr E. Alvaro, President of the Instituto de Organizacao do Trabalho, spoke at the October luncheon-discussion meeting of the National Management Council. He told the audience what plans his organization is making for the forth-coming Congress. The Congress will be held in one of the newer theatres which will seat about 3,000 people. Meeting rooms for group discussions are available. Trips are being planned to the modern industrial installations of Sao Paulo, as well as a coffee plantation nearby.

For the relaxation of delegates, guest privileges will be granted at the swimming, golf and tennis clubs. Dr. Alvaro spoke of the pleasant temperatures, even though it will be summer when the Congress convenes. He invited everyone at the luncheon to attend this important Congress. Make your plans to go to the Xth International Management Congress now! ✪

CHAPTER	SUBJECT	SPEAKER	TITLE	PLACE	DATE
Allentown	Management, Trade Unions, and Community Functions in Discharge of Personnel Functions	Solomon Barkin	Director of Research CIO Textile Workers Union	White Farm Inn	13
	Methods Training—Round Table	W. J. Richardson		Rm. 262, Packard Lab., Lehigh Univ.	26
	Time Study Clinic				30
Asheville	Industry's Cooperation with Jr. Achievement—Panel	Ellery Farnam	Vice President, Farnam Mfg. Co.	Battery Park Hotel	8
	Budgeting	James Webb	Director of U.S. Budget	George Vanderbilt	15
	Employment Security Commission and You—Panel	B. C. Wilson	Mgr., Asheville Office, North Carolina Employment Service	George Vanderbilt	22
Atlanta	What Should Be Expected of a Trade Association? —Panel	Representatives from Ga. Cotton Mfgs. Assoc., Associated Industries of Ga., Pulp and Paper Mfgs., Trucking Assoc.		Atlanta Athletic Club	8
Baltimore	Managing for Profit	Don F. Copell	Vice President, Wagner Baking Corp.		6
Birmingham	Management Problems in Government Contracts	M. R. Ruggieri	Plant Mgr., Southern Line Material, Inc.	Moulton Hotel	9
Boston	The Control of Marketing Costs	Bruce Payne	President, Bruce Payne & Associates	University Club	8
Bridgeport	Developments in Surveying Employee Attitudes	Arthur Kolstad	Arthur Kolstad, Inc.	Hotel Barnum	13
	Plant Visitation			Raybestos Div., Raybestos Manhattan, Inc., Stratford, Conn.	20
Central Pa.	Managerial Opportunities for Women	Miss Ruth Leach	Vice President, IBM	State College	22
Charlotte	Case Study of Jackson Mfg. Co.	George Powell			12
	Material Handling	Robert W. Newsome, Jr.	Ind. Engr., R. J. Reynolds Co.	Hotel Barringer	13
	Case Study of Redford Brass Fabricating Co.	C. C. Hope, Jr.			26
Chicago	Group Discussion—Ind. Engr. Section—I.E. Headaches				13
	General Meeting			Furniture Club	27
Cincinnati	Effective Employee Communications	Ralph Nordyke	Gen. Dir. of Ind. Relations, Fisher Div., General Motors Corp.	Hotel Alms	7
	Where Foremen and Time Study Men Meet	Phil Carroll	Industrial Engineer		6
Detroit	Annual Time Study Conference of SAM & ASME			Hotel Robert E. Lee, Winston-Salem	30
Greensboro	How to Overcome Resistance to Change	Allan Mogensen		Hotel Greenville	14
Greenville	Economic Outlook for New England	Alfred C. Neal	First Vice President, Federal Reserve Bank of Boston		15
Hartford					
Hudson Valley	Development Role in Meeting and Beating Competition	Dr. D. B. Keyes	Consultant, Arthur D. Little Co.	Hendrik Hudson Hotel, Troy	6
	Introductory Time Study Group				12
	Advanced Time Study Clinic				19
	Introductory Time Study Group				26
Lancaster	Humanizing the Supervisor	Edward T. Ellis	Director of Personnel, McCormick & Co.	Hotel Brunswick	20
Milwaukee	If Management Doesn't Manage, Who Will?	W. Grede	NAM President	ESM Building	8
Montreal	Ind. Engr. Techniques as Applied to Office Work	D. R. Turnbull	J. D. Woods & Gordon, Ltd.	Ritz Carlton Hotel	
New Brunswick	Ind. Mgt. Principles Applied to Local Hospitals	Walter J. Metts	Vice President, Personal Products Corp.	Roger Smith Hotel	15
New Haven	A Technique for Determining Hidden Lost Time	Chester L. Brisley	Wolverine Tube Div., Calumet & Hecla Consolidated Copper Co.	The Towne House	22
New York	Foreign Development and U.S. Management			Statler Hotel	15
Philadelphia	Work Simplification in The Home	Panel Discussion—Industrial Engineers and Home Economists (Ladies Nite)		Poor Richard Club	6
	Power Calculations	L. Eschner			8
Pittsburgh	Planning and Measurement Techniques for Modern Selling	Frank Armour, Jr.	Vice President, General Mgr. of Sales & Distribution, H. J. Heinz Co.	Hotel Webster Hall	15
Richmond	The Application of TS & M to Sales and Distribution	Noble Hall	Mgr., Sales Research, Atlanta Refining	William Byrd Hotel	27
Trenton	Conference—Union or Open Shop— For Better Relations				12
	Production Control Systems for Alert Managements	Palmer Hager	Special Rep., Manuf. Control, IBM	Hotel Hildebrecht	20
Washington	Government—Business Relations in International Trade	Alden W. Boyd	MSA	Federal Personnel Council	5
	Management of Equipment and Goods	Oscar Cox	Attorney	Archives, Room 105	6
		Gustave A. Moe	GSA		
	Scientific Management in the Home	D. C. Downs	Stern Co.	Departmental Aud., Conf. Room A	8
		Robert K. Friedman	Navy		
	Government-Business Relations	Mrs. Catherine R. Morhard		Federal Personnel Council	12
		G. Lyle Belsley	NPA		
	Dinner Meeting	Donald G. Shook	NPA	Barker Hall, YMCA	15
	Financial Management	Leo Miller	Federal Sec. Administration	Departmental Aud., Conf. Room B	19
	Organization & Mgt. Methods in Business & Gov'mnt	Karney A. Brasfield	GAO	Federal Personnel Council	20
	Management of Scientific Research	John J. Corson	McKinsey & Co.	Federal Personnel Council	22
	Legal Aspects of Management	Ivan Asay	Bureau of Standards	Departmental Aud., Conf. Room B	27
		John G. Alexander	NPA		
Wilmington	Incentives for Supervision	Peter R. Nehemkis	Attorney	Hob Tea Rm., Delaware Trust Bldg.	6
		L. C. Shinn	Works Staff Superintendent, International Nickel Co.		

*This is a summary of the Chapter activities reported. Programs of the other 27 will be listed upon receipt.

The Management Bookshelf

Planning and Developing the Company Organization Structure, by ERNEST DALE, published by the American Management Association, New York, N. Y., 1952.

Mr. Dale has written up the results of a two-year survey in which he and his associates "visited 40 companies, . . . participated in the work of changing company organization, . . . examined and analyzed several hundred organization manuals and organization charts, . . . and talked to and corresponded with many outstanding thinkers and practitioners on organization."

"Too many executives speak about organizational problems in terms of what they believe they ought to do rather than in terms of what they are doing." This book attempts and generally succeeds in bridging the gap between what is being done and what ought to be done.

Besides the conclusion and the appendices, the book is divided into two parts. Part One, "The Dynamics of Organization," discusses the "organization problems at the various stages of company growth," while Part Two, "The Mechanics of Organization," brings out the methods of determining the need for organization changes and the methods of making the changes.

Mr. Dale points out the dynamic nature of business activities requires that the management of any enterprise review its organization structure regularly to maximize its effectiveness. While there is no formula nor model that can be used for all situations, there is a need for a better method than the present one of measuring the effectiveness of the present and proposed organizations. He discusses the need for building and continually reviewing the relationships of the jobs and the people in the organization so that the company objectives are attained.

In "The Dynamics of Organization," division of work, delegation of responsibility, span of control, staff assistants, staff specialists, group decision making, and decentralization are concisely but ably presented. The author points out the high percentage of large companies regularly using group action, then discusses the role of the committee, with its limitations, in the organization.

Part Two, "The Mechanics of Organization," presents the problems surrounding the changes in organization. After recognizing the need for a change, a company must cope with the problem of selling the idea to the people involved. Who should make the change, the timing of the change, constructing the best organization, the organizational manual, and gaining acceptance of the new plan are discussed in a very concrete manner.

The appendices include analyses of some of the findings of the study. These include top management job descriptions, committee membership, scope, and responsibilities, departmental relationships when decentralized, content of departmental functions, outline of a management guide, and organizational nomenclature. The appendices make available a guide for executives in planning their organizational manuals and/or in establishing the responsibilities of the various positions in the organization.

Mr. Dale's book is an excellent blending of the results of the survey of companies, views of organizational practitioners, and the more theoretical aspects as presented in various publications.

CHARLES R. SCOTT, JR.
Associate Professor of Management
University of Alabama

Personnel Interviewing, by JAMES D. WEINLAND and MARGARET V. GROSS, published by the Ronald Press Company, New York, N. Y., 1952.

This book covers both the philosophy and technique of interviewing in detail. The authors have assembled and interpreted the large volume of literature on the subject in an objective and conscientious manner. In instances where there are differences of viewpoint, they have stated both sides impartially though not hesitating to indicate their own preferences. Constant emphasis throughout the book on the dangers of typing individuals by race, education, age, environment, appearance or mannerism seems especially well presented. The discussion of the value of experience as an interviewer for future jobs of supervisory or executive nature is not only well pointed-up but rather unique in a book of this kind.

Much of what is known of interviewing can be obtained from a painstaking and notetaking reading of the book. It is hard reading, not because each paragraph is not clear and simply expressed, but because of its general organization, or rather lack of organization. It reminds one of an excellently illustrated lecture of a trip around the world where the box of slides had been dropped just before the lecture and there had been no time for reassembling.

The inclusion of many excellent though scattered ideas in a given chapter may be illustrated by Chapter 9, "By-Products of the Interview." There is an excellent paragraph warning against the typing of individuals. The illustrations given are apt and different than those given in the numerous other places where the topic is also discussed. There are several paragraphs on how to start and develop an interview which would seem to have direct connection with the previous chapter on training interviewers. Interviewing as training for supervisory or executive positions is covered twice—once under benefits to the interviewer and once under benefits to the company.

A person who had had a limited amount of experience with interviewing was asked to read the book with no instructions on notetaking. She came back with several excellent ideas on interviewing that she had gotten from the reading but when asked to identify them for reference, she practically had to reread the book.

The material is complete but one becomes frustrated trying to find any particular point. Because of this the book will probably not make the contribution to the training of interviewers which the material contained in it really should, nor will it serve as an easily used reference book.

DR. MARION A. BILLS
Assistant Secretary
Aetna Life Insurance Company
Hartford 15, Conn.

P

G

Ed

S
N

HO

La
Ban
"W

New

PROFESSIONAL NOTICES

CLASSIFIEDS

POSITIONS WANTED

YOUNG ENGINEER seeks work in management consulting field or sales engineering. 1½ years experience in work measurement and incentive installation—MBA in Industrial Management, B.S. in Mechanical Engineering. SAM Box 342-W.

SENIOR INDUSTRIAL ENGINEER

Excellent background with Steel, Electrical and Mechanical Companies, I.E. grad., age 33, 7 yrs. exp. Staff or supervisory position desired with top-flight organization. N.E. location preferred. SAM Box 345-W.

INDUSTRIAL ENGINEER

Twelve years experience, including construction, sheet metal, electro-mechanical devices, naval ordnance. Competent production planning and control, assembly methods, incentives, cost reduction, standards and administration. Age 35. Highest recommendations. Presently employed at $8,400 base salary. SAM Box 344-W.

WANTED IN PHILA., PA.

A used Productrol Board, minimum 50 pockets. State price, condition and accessories. SAM Box 343.

RATES Classified insertions are billed at $1.50 a reading line per issue for Positions Open and at $1.00 for Positions Wanted. Lines average five words. A heading in bold type counts as two lines. There are 9 lines to the inch. Minimum insertion charge, five-line basis. Display advertisements are carried in this issue at a minimum of 1½ inches. Copy must reach us not later than the 5th of the month preceding date of publication.

Answers to box number advertisements should be addressed to given box number, care of ADVANCED MANAGEMENT, 411 Fifth Avenue, New York 16, N. Y.

Announcing . . . .

40th Anniversary Conference Issue

of

ADVANCED MANAGEMENT

January 1953

The Society for the Advancement of Management and its predecessor organization, The Taylor Society, have always sought to meet the goals set forth in the quotations below. This 40th Anniversary Issue assures the widest possible dissemination for the papers and discussions presented at the Society's Conference, held on October 30-31st.

"The activities of the Taylor Society best known to the public are educational in their nature—meetings at which fundamental problems of management are considered in authoritative papers and discussions."

——— BULLETIN OF THE TAYLOR SOCIETY
10th Anniversary Issue

"Mr. Gilbreth spoke at length on the necessity for such a society . . . to act as a clearing house for ideas."

——— ROBERT T. KENT in a talk entitled, "The Taylor Society Twenty Years Ago" at the 20th Anniversary Dinner of the Taylor Society.

"First a management society is a source of information and assistance to which I can turn, as an individual member, for aid in the solution of a specific management problem . . . a management society provides a forum in which its members can present their ideas and views."

——— RALPH DAVIS in a review of the first five years of the Society for the Advancement of Management.

Additional copies of the January 1953 issue will be available as long as the supply lasts. Members' price—$3.50 per copy, non-members of the Society—$5.00 per copy.